PROJECT MANUAL

COUSHATTA TRIBE EDUCATIONAL BUILDING

1950 CC BEL ROAD
ELTON, LOUISIANA

ARCHITECT OF RECORD
NELSON WORLDWIDE
MINNEAPOLIS, MN

DESIGN ARCHITECT
FULL CIRCLE INDIGENOUS PLANNING
MINNEAPOLIS, MN

LOCAL ARCHITECT
MIA KAPLAN STUDIO
SLIDELL, LA

LANDSCAPE ARCHITECT
DANA BROWN & ASSOCIATES
NEW ORLEANS, LA

STRUCTURAL
MARAIS CONSULTANTS
NEW ORLEANS, LA

MECHANICAL/ELECTRICAL/PLUMBING
WINDWARD ENGINEERING
MINNEAPOLIS, MN

SPECIFICATIONS CONSULTANT
KRAMER CS
ATLANTA, GA

NELSON

BID SET ISSUE **ISSUE DATE: 12/05/2025**

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SECTION 00 3132

GEOTECHNICAL DATA

PART 1 GENERAL

1.01 GEOTECHNICAL DATA

A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information. This Document and its attachments are not part of the Contract Documents.

B. Because subsurface conditions indicated by the soil borings are a sampling in relation to the entire construction area, and for other reasons, the Owner, the Architect, the Architect's consultants, and the firm reporting the subsurface conditions do not warranty the conditions below the depths of the borings or that the strata logged from the borings are necessarily typical of the entire site. Any party using the information described in the soil borings and geotechnical report shall accept full responsibility for its use.

C. The following geotechnical investigation report is available from the Architect for viewing:

1. Geotechnical Engineering Report:
    a. Coushatta Education Building.
    b. Elton, Louisiana.
2. Prepared for:
    a. Coushatta Tribe of Louisiana.
    b. Elton, LA.
3. Prepared by:
    a. Terracon Consultants, Inc.
    b. Sulphur, LA.
    c. Terracon Project No. EU255000.

D. Additional information may be available from Owner or Architect.

E. Clarifications:

1. The opinions expressed in this report are those of a geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by a geotechnical engineer. Owner is not responsible for interpretations or conclusions drawn from the data.
2. Any party using information described in the geotechnical report shall make additional test borings and conduct other exploratory operations that may be required to determine the character of subsurface materials that may be encountered.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

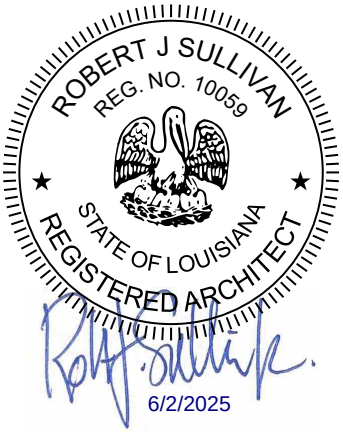
NELSON
901 Marquette Ave., Suite 2850
Minneapolis, MN 55402

ARCHITECT'S CERTIFICATION OF
NO CHANGE IN FEDERAL CONTRACT DOCUMENTS

This is to certify that no change (alterations, modifications, or deletions) have been made in the reproduction of USDA, Rural Development Standard Contract Documents, with the exception of the following:

None

Architect Name: Robert Sullivan
Firm: NELSON
Date: 5/30/2025



SECTION 00 0100

ADVERTISEMENT FOR BID

COUSHATTA TRIBE OF LOUISIANA , ELTON, LA

COUSHATTA EDUCATION BUILDING

ADVERTISEMENT FOR BIDS

Sealed Bids for the construction of the Coushatta Education Building Access Road will be received from Bidders, by the Coushatta Tribe of Louisiana, at the office of 1940 CC Bel Road, Elton, LA 70532 until 2 pm CST local time Tuesday 1/20/2026, at which time the Bids received will opened and reviewed. Bid Receiver's computer clock drives the closing time. Bid award will be pending USDA review and approval is anticipated around 1/29/2026.

This project consists of the construction of a new community education assistance building approximately 12,000 SF with offices, classroom, commercial kitchen, covered patio and exterior landscaping, and new utilities.

Bids will be received for a single prime Contract. Bids shall be on a lump sum with unit prices included for the purpose of change order negotiation when necessary. Coushatta Tribe of Louisiana reserves the right to award the bid based on consideration of all factors and not solely on low bid for the lump sum portion.

This agreement is for services related to a project that is subject to the Build America, Buy America Act (BABAA) requirements under Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58. Absent an approved waiver, all iron, steel, manufactured products, and construction materials used in this project must be produced in the United States, as further outlined by the Office of Management and Budget's Memorandum M-22-11, Initial Implementation Guidance on Application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure, April 18, 2022.

The Issuing Office for the Bidding Documents is the Coushatta Tribe of Louisiana, 1940 CC Bel Road, Elton, LA 70532.

Any questions regarding the bid should be submitted no later than 1/13/25 and by email to Keith Banes at KeithB@wenahagroup.com, Steve Manual at smanual@coushatta.com, and Rebecca Muchow at rmuchow@nelsonww.co. Prospective Bidders will be supplied with plans and specifications via email with a link from Keith Banes of Wenaha Group. Bids can be hand delivered, delivery by carrier, or emailed to Keithb@wenahagroup.com with CC of smanual@coushatta.com and rmuchow@nelsonww.com.

A pre-bid conference will be held virtually at 9:00 am CST local time on 1/12/2026. Attendance at the pre-bid conference is required. A link to the meeting will be issued to all plan holders by 1/9/2026. A site visit is required prior to bid submission and dates will be announced for coordination at the pre-bid meeting.

Bids to be addressed to:

Owner: **Coushatta Tribe of Louisiana**

By: **Kristian Poncho**

Title: **Secretary-Treasurer**

Bid Date: **Tuesday, January 20, 2026**

END OF INVITATION FOR BID

SECTION 00 0200

INSTRUCTIONS TO BIDDERS

GENERAL

1.01 DEFINITIONS

A. Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement or Invitation to Bid, Instructions to Bidders, Supplementary Instructions to Bidders, the bid form, and other sample bidding and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications and all Addenda issued prior to execution of the Contract.

B. Definitions set forth in the General Conditions of the Contract for Construction, AIA Document A201, or in other Contract Documents are applicable to the Bidding Documents.

C. Addenda are written or graphic instruments issued by the Architect prior to the execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections.

D. A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

E. The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in Alternate Bids.

F. An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as descried in the Bidding Documents, is accepted.

G. A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

H. A Sub-Bidder is a person or entity who submits a bid to a Bidder for materials, equipment, or labor for a portion of the Work.

1.02 BIDDER'S REPRESENTATIONS

A. The Bidder by making a Bid represents that:

1. The Bidder has read and understands the Bidding Documents or Contract Documents, to the extent that such documentation relates to the Work for which the Bid is submitted, and for the other portions of the Project, if any, being bid concurrently or presently under construction.

2. The Bid is made in compliance with the Bidding Documents

3. The Bidder has visited the site, become familiar with local conditions under which the Work is to be performed and has correlated the Bidder's personal observations with the requirements of the proposed Contract Documents.

4. The Bid is based upon the materials, equipment, and systems required by the Bidding Documents without exception.

1.03 BIDDING DOCUMENTS

A. COPIES

1. Prime Bidders may obtain complete sets of the Bidding Documents electronically from plan exchange rooms noted below and from the issuing office designated in the Advertisement or Invitation to Bid.

2. Print sets will not be provided by the issuing office designated in the Advertisement or Invitation to Bid. Duplication of partial or whole sets through plan exchange rooms may be available at a rate per sheet as determined by the designated plan exchange rooms.

3. Bidders shall use complete sets of Bidding Documents in preparing Bids; neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

4. No license or grant of use is conferred by issuance of copies of the Bidding Documents.

1.04 QUALIFICTION OF BIDDERS

A. Prospective Bidders shall submit the required information regarding their qualifications with their bid. Owner will review the submitted information to determine which contractors are qualified to bid on the Work. The information that each prospective Bidder must submit includes (a) written evidence establishing its qualifications such as financial data, previous experience, and present commitments, and (b) the following additional information:

1. Evidence of prospective Bidder's authority to do business in the state where the Project is located.

2. Prospective Bidder's license number.

3. Subcontractor and Supplier qualification information; coordinate with provisions of these Instructions, "Subcontractors, Suppliers, and Others."

B. A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.

C. No requirement in this document to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.

D. Bidder is advised to carefully review those portions of the Bid Form requiring Bidder's representations and certifications.

1.05 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

A. The Bidder shall carefully study and compare the Bidding Documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates

to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.

B. Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request which shall reach the Architect at least seven days prior to the date for receipt of Bids.

C. Interpretations, corrections and changes of the Bidding Documents will be made by Addendum. Interpretations, corrections and changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon them.

1.06 SUBSTITUTIONS

A. The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

B. Any request for substitute or "or equal" shall include a Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58.

C. No substitution will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least 10 days prior to the date for receipt of Bids. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the work of other contracts that incorporation of the proposed substitution would require, shall be included The burden of proof of the merit of the proposed substitution is upon the proposal. The Architects' decision of approval or disapproval of a proposed substitution shall be final.

D. If the Architect approves a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

E. No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

1.07 ADDENDA

A. Addenda will be transmitted to all who are known by the issuing office to have received a complete set of Bidding Documents.

B. Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

C. Addenda will be issued no later than four days prior to the date for receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

D. Each Bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

1.08 BIDDING PROCEDURES

A. PREPARATION OF BIDS

1. Bids shall be submitted on the forms included with the Bidding Documents.

2. All blanks on the bid form shall be legibly executed in a non-erasable medium.

3. Sums shall be expressed in both words and figures. In case of discrepancy, the amount written in words shall govern.

4. Interlineations, alterations and erasures must be initialed by the signer of the Bid.

5. All requested Alternates shall be bid. If no change in the Base Bid is required, enter "no Change."

6. Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder's refusal to accept award of less than the combination of ids stipulated by the Bidder. The Bidder shall make no additional stipulations on the bid form nor qualify the Bid in any other manner.

7. Each copy of the Bid shall state the legal name of the Bidder and the nature of legal form of the Bidder. The Bidder shall provide evidence of legal authority to perform within the jurisdiction of the Work. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further give the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have current power of attorney attached certifying the agent's authority to bind the Bidder.

8. BABAA requirements apply to this project.

1.09 RECEIPT AND OPENING OF BIDS

A. Bids received shall be for Single Prime contracts for combined General, Civil, Mechanical and Electrical Work.

B. Bids shall be deposited at the designated location prior to the time and date for receipt of Bids. Bids received after the time and date for the receipt will be returned unopened.

C. The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

D. Any Bid may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement thereof. Any bid received after the time and date specified shall not be considered. No bidder may withdraw a bid within 60 days after the actual date of opening thereof.

E. The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until either (a) the Contract has been executed and bonds, if required, have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn or (c) all Bids have been rejected.

1.10 SUBMISSION OF BIDS

A. Each bid must be submitted in a sealed envelope bearing on the outside the following information:

1. NAME OF PROJECT:
2. NAME OF BIDDER:
3. ADDRESS OF BIDDER:
4. THE WORDS: BID PROPOSAL FOR CONSTRUCTION WORK.

B. All bids and proposal for the construction of any contract project subject to the provisions of this chapter must contain a copy of the license or certificate of renewal thereof issued by the secretary of state enclosed in the required bid bond envelope.

1. No contract shall be awarded to any contractor unless he or she is the holder of a license in the class within which the value of the project shall fall as herein before provided. A contractor must be the holder of a license at least ten days prior to the date set for receiving bids, to be a qualified bidder. A bid submitted without this information properly enclosed in the Bid Bond envelope shall not be read nor considered and shall be returned to the bidder.
2. Attach to the sealed bid envelope shall be a separate sealed bid bond envelope containing a copy of the contractor's license or certificate of renewal thereof issued by the Louisiana Secretary of State. The outside of the envelope shall contain the following information:
   a. NAME OF PROJECT:
   b. NAME OF BIDDER:
   c. ADDRESS OF BIDDER:
   d. THE WORDS: BID PROPOSAL FOR CONSTRUCTION WORK.
3. Oral, telephone, telegraphic, facsimile or other electronically transmitted bids will not be considered.
   a. NAME OF PROJECT:
   b. NAME OF BIDDER:
   c. ADDRESS OF BIDDER:
   d. THE WORDS: BID PROPOSAL FOR CONSTRUCTION WORK.
4. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid shall be addressed to 1940 CC Bel Road, Elton, LA 70532.

1.11 SUBCONTRACTS, SUPPLIERS, AND OTHERS

A. A Bidder shall be prepared to retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of the Work if required by the Bidding Documents (most commonly in the Specifications) to do so. If a prospective Bidder objects to retaining any such Subcontractor, Supplier, or other individual or entity, and the concern is not relieved by an Addendum, then the prospective Bidder should refrain from submitting a Bid.

B. Subsequent to the submittal of the Bid, Owner may not require the Successful Bidder or Contractor to retain any Subcontractor, Supplier, or other individual or entity against which Contractor has reasonable objection.

C. The apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening, submit to Owner a list of the Subcontractors or Suppliers proposed for the following portions of the Work: demolition, cast-in-place concrete, structural steel, masonry, roofing, siding, storefront systems, cold-form framing, gypsum board, hvac, electrical, plumbing, storm sewer, earthwork and grading, roadway paving, site restoration, and erosion control. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, or other individual or entity. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case apparent Successful Bidder shall submit a substitute, Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.

D. If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, or other individuals or entities. Declining to make requested substitutions will constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject the terms of the contract.

1.12 MODIFICAITONS OF BIDS

A. A Bid may be withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.

B. If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 16.01 and submit a new Bid prior to the date and time for the opening of Bids.

C. If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work.

1.13 BID SECURITY

A. A Bid must be accompanied by Bid security made payable to Owner in an amount of 10% percent of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a certified check, bank money order, or a Bid bond (on the form included in the Bidding Documents) issued by a surety meeting the requirements of Agreement between the owner and contractor.

B. The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract Documents, furnished the required contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited. Such forfeiture shall be Owner's exclusive remedy if Bidder defaults.

C. The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Contract or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.

1.14 CONSIDERATION OF BIDS

A. OPENING OF BIDS

1. At the discretion of the Owner, if stipulated in the Advertisement or Invitation to Bid, the properly identified Bids received on time will be opened and will be reviewed. An abstract of the Bids may be made available to Bidders.

B. REJECTION OF BIDS

1. The Owner shall have the right to reject any or all Bids. A Bid not accompanied by a required bid security or by other data required by the Bidding Documents, or a Bid which is in any way incomplete or irregular is subject to rejection.

C. ACCEPTANCE OF BID (AWARD)

1. It is the intent of the Owner to award a Contract to the lowest qualified Bidder provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. The Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's best interests.

2. The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the low Bidder on the basis of the sum of the Base Bid and Alternates accepted.

3. The following requirements apply to the Bid Award Criteria and Procedures for the Project:

    a. Procurement will be publicly advertised.

    b. Selection will be based on best value for Coushatta Tribe of Louisiana (CLTA)

    c. RFB will include the following provisions for selection criteria

i. General Experience of firm and staff
ii. Qualification of firm and staff
iii. Commitment of identified staff to the project
iv. Past experience with CTLA
v. Past experience with other Tribal Nations
vi. Capacity
vii. Schedule
viii. Funding requirements experience
ix. Contract terms agreement / objections
x. Bonding ability/rate
xi. Insurance requirements
xii. Total proposed cost
xiii. Unit prices and rates
xiv. Interview (optional, if needed as determined by CTLA)

d. Responses will be evaluated by team appointed by Council
e. Review team will score responses and provide recommendation to Council
f. Council will make final selection

1.15 TIME OF COMPLETION

A. Bidder agrees to commence work on or before a date to be specified in a written Notice to Proceed by the Owner and to fully complete the Construction Work as outlined in the project documents and as based on project alternates taken.

B. The Project is required to be substantially complete with beneficial occupancy by the Owner on or Before April 1, 2027.

1.16 CONDITIONS OF WORK

A. Each bidder must inform him or herself fully of the conditions relating to the constructions of the project. Failure to do so will not relieve a successful bidder of his obligation to furnish all material and labor necessary to carry out his work and must employ such methods or means as will not cause any interruption of or interference with the work of any other contractor.

1.17 PRE-BID CONFERENCE

A. A pre-Bid conference will be held virtually at the time and location stated in the invitation or advertisement to bid. Representatives of Owner and Architect will be present to discuss the

Project. Bidders are required to attend and participate in the conference. Architect will transmit to all prospective Bidders of record such Addenda as Architect considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

1.18 BONDS AND INSURANCE

A. PERFORMANCE, PAYMENT, AND OTHER BONDS

1. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of all of Contractor's obligations under the Contract. These bonds shall remain in effect until one year

after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the Supplementary Conditions, or other specific provisions of the Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions or other specific provisions of the Contract.

2. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

3. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.

4. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the bond and surety requirements above.

5. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights.

6. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.

B. POWER OF ATTORNEY

1. Attorneys-in-fact who sign bonds on contract bonds must fil with each bond a certified and effectively dated copy of their power of attorney.

1.19 LAWS AND REGULATIONS

A. The Bidder's attention is directed to the fact that all applicable State laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the contract throughout, and they will be deemed to be included in the contract the same as though herein written out in full.

B. Bidders must hold a Louisiana Contractor's license, carry Louisiana Worker's Compensation Insurance, and conform to all governing laws of the Sovereign Nation of the Coushatta Tribe of Louisiana and the State of Louisiana.

1.20 METHOD OF AWARD – LOWEST QUALIFIED BIDDER

A. The contract will be awarded on the basis of base bid or combination of the bae bid and such alternates that produce the most complete project as desired by the Owner within the allowable budget.

1.21 OBLIGATION OF BIDDER

A. At the time of the opening of bids, each bidder will be presumed to have inspected the site and to have read and to be thoroughly familiar with the plans and contract documents (including all addenda). The failure or omission of any bidder to examine any form, instrument, or document shall in no way relieve any bidder from any obligation in respect to his bid.

1.22 STATE EXCISE AND USE TAX (SALES TAX)

A. In submitting the bi, the bidder is understood to have included the bid price the state tax on all sales of building materials, supplies and equipment to contractors, subcontractors or builders for the erection of buildings or the alteration, repair or improvement.

1.23 CONTRACTOR'S REQUEST FOR CLEARANCE FORM

A. Contractor shall furnish a complete and current Tax Clearance Certificate along with his or her Performance-Payment Bond, Insurance Certificate and other contractual items along with signed contracts.

END OF SECTION

SECTION 00 0410

BID PROPOSAL FORM

To: Kristian Poncho

Secretary-Treasurer

Coushatta Tribe of Louisiana

Having examined all bidding requirements, general conditions, specifications and drawings entitled **COUSHATT TRIBE – EDUCATION BUILDING,** Coushatta Tribe of Louisiana, Elton, Louisiana, dated 12/5/25, and addenda similarly entitled and numbered, _____, _____, _____, _____, _____, _____, as prepared by Nelco Architecture, Inc.; QK4, Inc., Civil Engineering; Dana Brown & Associates, Landscape Architect; Marais Consultants, Structural Engineer; Windward Engineering, MEPFA Engineering; and Moynan Consulting, LLC, Food Service Designers, and having visited the site and examined all conditions affecting the work, the undersigned agrees to furnish and pay for all labor, materials, and equipment for the following Construction Contract as required by the afore-mentioned documents for the following proposals:

Stipulated Sum Base Bid for General Construction_____

_____Dollars, ($_____.____)

Unit prices shall be shown in words and figures for each item listed in this proposal, and tin the event of discrepancy, the words shall control. Unit price is an amount proposed by Bidders and stated on the Bid Form as a price per unit of measurement for materials or services. The Unit price is to included all costs of material, labor, overhead, profit, taxes and insurance for the completely installed unit.

Unit Price 1 - EV Charging Stalls QTY: UNIT: UNIT BID PRICE: $_____

State the unit price amount to provide EV Charging Spaces as indicated on E100 Site Plan Electrical, and all associated demolition, to provide the wiring and Dual EV Chargers. EV Charger Brand and Model to Match what is on other Tribal Property.

Unit Price 2 - Seal Coat Parking Lot QTY: UNIT: UNIT BID PRICE: $_____

State the unit price amount to seal coat the existing 32-stall parking lot and drive adjacent south to the new building within one year of construction indicated on C2.01 Layout Plan, and including all necessary restriping.

Unit Price 3 - Replace ADA stalls as Concrete QTY: UNIT: UNIT BID PRICE: $_____ __

State the unit price amount to cut and remove existing asphalt ADA parking stalls (2 thus) and associated accessibility aisle and replace with concrete surface for ADA parking stalls (2 thus) and associated accessible aisle. Include all necessary striping and signage as indicated on 2/AS1.01, 2/AS1.01, and 6/AS1.01 and provide tie in with new accessible curb cut and adjacent sidewalk as indicated on 4/AS1.01 and 5/AS1.01. See detail 1/C6.01 for concrete parking pavement typical section and 2/C6.01 for sidewalk typical section.

BIDDER has familiarized themselves with the nature and extent of the Contract Documents including Work, site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance or furnishing of the Work.

BIDDER is familiar with all laws and regulations that may affect cost, progress, and performance of the work, including BABAA requirements. The recipient must comply with the provisions of the Build America, Buy America Act (the "Act"). Pub. L. No. 117-58, §§ 70901-52, enacted on November 15, 2021.

BIDDER has given the Architect and its consultants written notice of all conflicts, errors, or discrepancies that it has discovered in the Contract Documents and the written resolution by the Architect is acceptable to BIDDER.

NOTE: This BID FORM Shall be submitted in DUPLICATE

SIGNED:

_____, **a (Sole Proprietorship) (Partnership) (Corporation).**
FIRM NAME **(strike through two)**

_____,
Street Address

_____,
City, State, Zip Code Address

_____, _____,
Signed By, **Title**

_____, _____,

Signed By, **Title**

_____, _____,

Signed By, **Title**

_____, _____,

Signed By, **Title**

_____, _____,

Witnessed By, **Title**

1. Sole Proprietorship: Signature of Sole Proprietor in the presence of a witness who will also sign. Insert the words “Sole Proprietor” under the signature. Affix seal.
2. Partnership: Signature of all partners in the presence of a witness who will also sign. Insert the word “Partner” under each signature. Affix seal to each signature.
3. Corporation: Signature of a duly authorized signing officer(s) in their normal signatures. Insert the officer’s capacity in which the signing officer acts, under each signature. Affix the corporate seal. If the bid is signed by officials other than the president and the secretary of the company, or the president/secretary/treasurer of the company, a copy of the by-law resolution of their board of director’s authorizing them to do so, must be submitted with the Bid Form in the bid envelope.

The Following items are a condition of this Bid:

1. Bid Security in the form of ten percent Bid Bond (Enclose in Bid Security envelope).
2. Copy of Louisiana Contractor’s license or Certificate of Renewal (Enclose in Bid Security envelop).

END OF BID PROPOSAL FORM

DRAFT

AIA® Document A701® – 2018

Instructions to Bidders

for the following Project:
(Name, location, and detailed description)

«Coushatta Tribe Educational Building »
« 1940 CC Bel Rd, Elton, LA 70532 »
« 12,000 SF new construction, educational assistance facility

THE OWNER:
(Name, legal status, address, and other information)

«Coushatta Tribe of Louisiana »« »
«Federally recognized Tribe and sovereign authority »
«1940 CC Bel Rd, Elton, LA 70532 »

THE ARCHITECT:
(Name, legal status, address, and other information)

«Nelco Architecture, Inc. »« »
«901 S. Marquette Avenue, Suite 2850»
«Minneapolis, MN ~~55402 »~~55402 »
« »

TABLE OF ARTICLES

1 DEFINITIONS

2 BIDDER'S REPRESENTATIONS

3 BIDDING DOCUMENTS

4 BIDDING PROCEDURES

5 CONSIDERATION OF BIDS

6 POST-BID INFORMATION

7 PERFORMANCE BOND AND PAYMENT BOND

8 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

FEDERAL, STATE, AND LOCAL LAWS MAY IMPOSE REQUIREMENTS ON PUBLIC PROCUREMENT CONTRACTS. CONSULT LOCAL AUTHORITIES OR AN ATTORNEY TO VERIFY REQUIREMENTS APPLICABLE TO THIS PROCUREMENT BEFORE COMPLETING THIS FORM.

It is intended that AIA Document G612™–2017, Owner's Instructions to the Architect, Parts A and B will be completed prior to using this document.

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ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents include the Bidding Requirements and the Proposed Contract Documents. The Bidding Requirements consist of the advertisement or invitation to bid, Instructions to Bidders, supplementary instructions to bidders, the bid form, and any other bidding forms. The Proposed Contract Documents consist of the unexecuted form of Agreement between the Owner and Contractor and that Agreement's Exhibits, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, all Addenda, and all other documents enumerated in Article 8 of these Instructions.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, or in other Proposed Contract Documents apply to the Bidding Documents.

§ 1.3 Addenda are written or graphic instruments issued by the Architect, which, by additions, deletions, clarifications, or corrections, modify or interpret the Bidding Documents.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents, to which Work may be added or deleted by sums stated in Alternate Bids.

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from, or that does not change, the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment, or labor for a portion of the Work.

ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 By submitting a Bid, the Bidder represents that:

- **.1** the Bidder has read and understands the Bidding Documents;
- **.2** the Bidder understands how the Bidding Documents relate to other portions of the Project, if any, being bid concurrently or presently under construction;
- **.3** the Bid complies with the Bidding Documents;
- **.4** the Bidder has visited the site, become familiar with local conditions under which the Work is to be performed, and has correlated the Bidder's observations with the requirements of the Proposed Contract Documents;
- **.5** the Bid is based upon the materials, equipment, and systems required by the Bidding Documents without exception; and
- **.6** the Bidder has read and understands the provisions for liquidated damages, if any, set forth in the form of Agreement between the Owner and Contractor.

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 Distribution

§ 3.1.1 Bidders shall obtain complete Bidding Documents, as indicated below, from the issuing office designated in the advertisement or invitation to bid, for the deposit sum, if any, stated therein.
(Indicate how, such as by email, website, host site/platform, paper copy, or other method Bidders shall obtain Bidding Documents.)

« »

§ 3.1.2 Any required deposit shall be refunded to Bidders who submit a bona fide Bid and return the paper Bidding Documents in good condition within ten days after receipt of Bids. The cost to replace missing or damaged paper

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documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the paper Bidding Documents, and the Bidder's deposit will be refunded.

§ 3.1.3 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the advertisement or invitation to bid, or in supplementary instructions to bidders.

§ 3.1.4 Bidders shall use complete Bidding Documents in preparing Bids. Neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete Bidding Documents.

§ 3.1.5 The Bidding Documents will be available for the sole purpose of obtaining Bids on the Work. No license or grant of use is conferred by distribution of the Bidding Documents.

§ 3.2 Modification or Interpretation of Bidding Documents

§ 3.2.1 The Bidder shall carefully study the Bidding Documents, shall examine the site and local conditions, and shall notify the Architect of errors, inconsistencies, or ambiguities discovered and request clarification or interpretation pursuant to Section 3.2.2.

§ 3.2.2 Requests for clarification or interpretation of the Bidding Documents shall be submitted by the Bidder in writing and shall be received by the Architect at least seven days prior to the date for receipt of Bids.
(Indicate how, such as by email, website, host site/platform, paper copy, or other method Bidders shall submit requests for clarification and interpretation.)

«rmuchow@nelsonww.com »

§ 3.2.3 Modifications and interpretations of the Bidding Documents shall be made by Addendum. Modifications and interpretations of the Bidding Documents made in any other manner shall not be binding, and Bidders shall not rely upon them.

§ 3.3 Substitutions

§ 3.3.1 The materials, products, and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance, and quality to be met by any proposed substitution.

§ 3.3.2 Substitution Process

§ 3.3.2.1 Written requests for substitutions shall be received by the Architect at least ten days prior to the date for receipt of Bids. Requests shall be submitted in the same manner as that established for submitting clarifications and interpretations in Section 3.2.2.

§ 3.3.2.2 Bidders shall submit substitution requests on a Substitution Request Form if one is provided in the Bidding Documents.

§ 3.3.2.3 If a Substitution Request Form is not provided, requests shall include (1) the name of the material or equipment specified in the Bidding Documents; (2) the reason for the requested substitution; (3) a complete description of the proposed substitution including the name of the material or equipment proposed as the substitute, performance and test data, and relevant drawings; and (4) any other information necessary for an evaluation. The request shall include a statement setting forth changes in other materials, equipment, or other portions of the Work, including changes in the work of other contracts or the impact on any Project Certifications (such as LEED), that will result from incorporation of the proposed substitution.

§ 3.3.3 The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.4 If the Architect approves a proposed substitution prior to receipt of Bids, such approval shall be set forth in an Addendum. Approvals made in any other manner shall not be binding, and Bidders shall not rely upon them.

§ 3.3.5 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

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§ 3.4 Addenda

§ 3.4.1 Addenda will be transmitted to Bidders known by the issuing office to have received complete Bidding Documents.

(Indicate how, such as by email, website, host site/platform, paper copy, or other method Addenda will be transmitted.)

«By email and by host site/platform »

§ 3.4.2 Addenda will be available where Bidding Documents are on file.

§ 3.4.3 Addenda will be issued no later than four days prior to the date for receipt of Bids, except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

§ 3.4.4 Prior to submitting a Bid, each Bidder shall ascertain that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 Preparation of Bids

§ 4.1.1 Bids shall be submitted on the forms included with or identified in the Bidding Documents.

§ 4.1.2 All blanks on the bid form shall be legibly executed. Paper bid forms shall be executed in a non-erasable medium.

§ 4.1.3 Sums shall be expressed in both words and numbers, unless noted otherwise on the bid form. In case of discrepancy, the amount entered in words shall govern.

§ 4.1.4 Edits to entries made on paper bid forms must be initialed by the signer of the Bid.

§ 4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change" or as required by the bid form.

§ 4.1.6 Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder's refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall neither make additional stipulations on the bid form nor qualify the Bid in any other manner.

§ 4.1.7 Each copy of the Bid shall state the legal name and legal status of the Bidder. As part of the documentation submitted with the Bid, the Bidder shall provide evidence of its legal authority to perform the Work in the jurisdiction where the Project is located. Each copy of the Bid shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further name the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached, certifying the agent's authority to bind the Bidder.

§ 4.1.8 A Bidder shall incur all costs associated with the preparation of its Bid.

§ 4.2 Bid Security

§ 4.2.1 Each Bid shall be accompanied by the following bid security:

(Insert the form and amount of bid security.)

«ten percent (10%) of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a certified check, bank money order, or a Bid Bond issued by a surety meeting the requirements of Agreement between the owner and contractor. »

§ 4.2.2 The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and shall, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. In the event the Owner fails to comply with Section 6.2, the amount of the bid security shall not be forfeited to the Owner.

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§ 4.2.3 If a surety bond is required as bid security, it shall be written on AIA Document A310™, Bid Bond, unless otherwise provided in the Bidding Documents. The attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of an acceptable power of attorney. The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 4.2.4 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until (a) the Contract has been executed and bonds, if required, have been furnished; (b) the specified time has elapsed so that Bids may be withdrawn; or (c) all Bids have been rejected. However, if no Contract has been awarded or a Bidder has not been notified of the acceptance of its Bid, a Bidder may, beginning« »days after the opening of Bids, withdraw its Bid and request the return of its bid security.

§ 4.3 Submission of Bids

§ 4.3.1 A Bidder shall submit its Bid as indicated below:
(Indicate how, such as by website, host site/platform, paper copy, or other method Bidders shall submit their Bid.)

«Each bid must be submitted in a sealed envelope »

§ 4.3.2 Paper copies of the Bid, the bid security, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder's name and address, and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

§ 4.3.3 Bids shall be submitted by the date and time and at the place indicated in the invitation to bid. Bids submitted after the date and time for receipt of Bids, or at an incorrect place, will not be accepted.

§ 4.3.4 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

§ 4.3.5 A Bid submitted by any method other than as provided in this Section 4.3 will not be accepted.

§ 4.4 Modification or Withdrawal of Bid

§ 4.4.1 Prior to the date and time designated for receipt of Bids, a Bidder may submit a new Bid to replace a Bid previously submitted, or withdraw its Bid entirely, by notice to the party designated to receive the Bids. Such notice shall be received and duly recorded by the receiving party on or before the date and time set for receipt of Bids. The receiving party shall verify that replaced or withdrawn Bids are removed from the other submitted Bids and not considered. Notice of submission of a replacement Bid or withdrawal of a Bid shall be worded so as not to reveal the amount of the original Bid.

§ 4.4.2 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids in the same format as that established in Section 4.3, provided they fully conform with these Instructions to Bidders. Bid security shall be in an amount sufficient for the Bid as resubmitted.

§ 4.4.3 After the date and time designated for receipt of Bids, a Bidder who discovers that it made a clerical error in its Bid shall notify the Architect of such error within two days, or pursuant to a timeframe specified by the law of the jurisdiction where the Project is located, requesting withdrawal of its Bid. Upon providing evidence of such error to the reasonable satisfaction of the Architect, the Bid shall be withdrawn and not resubmitted. If a Bid is withdrawn pursuant to this Section 4.4.3, the bid security will be attended to as follows:
(State the terms and conditions, such as Bid rank, for returning or retaining the bid security.)

«return of the bid →»security »

ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 Opening of Bids

If stipulated in an advertisement or invitation to bid, or when otherwise required by law, Bids properly identified and received within the specified time limits will be publicly opened and read aloud. A summary of the Bids may be made available to Bidders.

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§ 5.2 Rejection of Bids
Unless otherwise prohibited by law, the Owner shall have the right to reject any or all Bids.

§ 5.3 Acceptance of Bid (Award)
§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest responsive and responsible Bidder, provided the Bid has been submitted in accordance with the requirements of the Bidding Documents. Unless otherwise prohibited by law, the Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's best interests.

§ 5.3.2 Unless otherwise prohibited by law, the Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the lowest responsive and responsible Bidder on the basis of the sum of the Base Bid and Alternates accepted.

ARTICLE 6 POST-BID INFORMATION

§ 6.1 Contractor's Qualification Statement
Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request and within the timeframe specified by the Architect, a properly executed AIA Document A305™, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted for this Bid.

§ 6.2 Owner's Financial Capability
A Bidder to whom award of a Contract is under consideration may request in writing, fourteen days prior to the expiration of the time for withdrawal of Bids, that the Owner furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. The Owner shall then furnish such reasonable evidence to the Bidder no later than seven days prior to the expiration of the time for withdrawal of Bids. Unless such reasonable evidence is furnished within the allotted time, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

§ 6.3 Submittals
§ 6.3.1 After notification of selection for the award of the Contract, the Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, submit in writing to the Owner through the Architect:

.1 a designation of the Work to be performed with the Bidder's own ~~forces;~~forces.
.2 names of the principal products and systems proposed for the Work and the manufacturers and suppliers of each; and
.3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

§ 6.3.2 The Bidder will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

§ 6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, withdraw the Bid or submit an acceptable substitute person or entity. The Bidder may also submit any required adjustment in the Base Bid or Alternate Bid to account for the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

§ 6.3.4 Persons and entities proposed by the Bidder and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 Bond Requirements
§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder.

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§ 7.1.2 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

§ 7.1.3 The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 7.1.4 Unless otherwise indicated below, the Penal Sum of the Payment and Performance Bonds shall be the amount of the Contract Sum.
(If Payment or Performance Bonds are to be in an amount other than 100% of the Contract Sum, indicate the dollar amount or percentage of the Contract Sum.)

« »

§ 7.2 Time of Delivery and Form of Bonds
§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract. If the Work is to commence sooner in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond.

§ 7.2.3 The bonds shall be dated on or after the date of the Contract.

§ 7.2.4 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix to the bond a certified and current copy of the power of attorney.

ARTICLE 8 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

§ 8.1 Copies of the proposed Contract Documents have been made available to the Bidder and consist of the following documents:

.1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

« »

.2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

« »

.3 AIA Document A201™–2017, General Conditions of the Contract for Construction, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

« »

.4 Building Information Modeling Exhibit, if completed:

« »

.5 Drawings

Number	Title	Date

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.6 Specifications

Section	Title	Date	Pages

.7 Addenda:

Number	Date	Pages

.8 Other Exhibits:
(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

[«—»« »] AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017.)

« »

[«—»« »] The Sustainability Plan:

Title	Date	Pages

[«—»« »] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

.9 Other documents listed below:
(List here any additional documents that are intended to form part of the Proposed Contract Documents.)

« »

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SECTION 00 0500

CONTRACT FORM OF AGREEMENT

GENERAL

1.01 OWNER CONTRACTOR AGREEMENT FORM

A. AIA DOCUMENT A101-2017 Standard Form of Agreement Between Owner and Contractor where the basis is a STIPULATED SUM, with A101-2017 Exhibit A Insurance and Bonds, will be the contractual form of agreement between the Owner and the Contractor.

B. This form is hereby made part of the contract documents and . Original forms will be utilized in the executed agreements.

C. Copies of this Agreement are available for review from the Architect.

END OF SECTION 00 0500

DRAFT

AIA® Document A101® – 2017

Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

AGREEMENT made as of the « » day of « » in the year « »
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

Coushatta Tribe of Louisiana
1940 CC Bell Road
Elton, LA 70532

and the Contractor:
(Name, legal status, address and other information)

« »« »
« »
« »
« »

for the following Project:
(Name, location and detailed description)

« »
« »
« »

The Architect:
(Name, legal status, address and other information)

« »« »
« »
« »
« »

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

The parties should complete A101®–2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201®–2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.



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TABLE OF ARTICLES

1 THE CONTRACT DOCUMENTS

2 THE WORK OF THIS CONTRACT

3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

4 CONTRACT SUM

5 PAYMENTS

6 DISPUTE RESOLUTION

7 TERMINATION OR SUSPENSION

8 MISCELLANEOUS PROVISIONS

9 ENUMERATION OF CONTRACT DOCUMENTS

EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:
(Check one of the following boxes.)

[« »] The date of this Agreement.

[« »] A date set forth in a notice to proceed issued by the Owner.

[« »] Established as follows:
(Insert a date or a means to determine the date of commencement of the Work.)

« »

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:
(Check one of the following boxes and complete the necessary information.)

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[« »] Not later than « » (« ») calendar days from the date of commencement of the Work.

[« »] By the following date: « »

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be « » ($ « »), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item	Price

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance

§ 4.3 Allowances, if any, included in the Contract Sum:
(Identify each allowance.)

Item	Price

§ 4.4 Unit prices, if any:
(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit ($0.00)

§ 4.5 Liquidated damages, if any:
(Insert terms and conditions for liquidated damages, if any.)

« »

§ 4.6 Other:
(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

« »

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ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

« »

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the « » day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the « » day of the « » month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than « » (« ») days after the Architect receives the Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 In accordance with AIA Document A201™–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

- **.1** That portion of the Contract Sum properly allocable to completed Work;
- **.2** That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- **.3** That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

- **.1** The aggregate of any amounts previously paid by the Owner;
- **.2** The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;
- **.3** Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- **.4** For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and
- **.5** Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:
(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

« »

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§ 5.1.7.1.1 The following items are not subject to retainage:
(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

« »

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:
(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

« »

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:
(Insert any other conditions for release of retainage upon Substantial Completion.)

« »

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2017.

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

« »

§ 5.3 Interest

Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.
(Insert rate of interest agreed upon, if any.)

« » % « »

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker.
(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

« »
« »
« »

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« »

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A201–2017, the method of binding dispute resolution shall be as follows:
(Check the appropriate box.)

[« X »] Arbitration pursuant to Section 15.4 of AIA Document A201–2017

[« »] Litigation in a court of competent jurisdiction

[« »] Other *(Specify)*

« »

6.2.1 By this Agreement, the Owner expressly waives its sovereign immunity from suit for the limited purpose of the following, and no other: permitting litigation for disputes or claims under this Agreement between the owner and the Contractor, including those which seek injunctive or declaratory relief, damages, specific performance or other legal and equitable remedies in the court or courts authorized by this agreement and to effect enforcement of any remedy gained therein. The limited waiver of sovereign immunity granted herein does not include any waiver, either express or implied, to any third party.

6.2.2. The Owner and Contractor specifically consent to be bound by the applicable State of Louisian statuts of limitation under this Paragraph as they apply to all claims.

6.2.3 This Agreement and all amendments thereto, shall be interpreted, governed and construed under the laws of the State of Louisiana without regard to applicable conflict of laws provisions. The Parties agree that any dispute arising under this Agreement shall be resolved by binding arbitration. Actions to enforce the arbitration decision(s) shall be brought in the United States Court for the Western District of Louisiana.

6.2.4 If the Parties do not resolve a dispute through mediation, the method of binding dispute resolution shall be by arbitration. Furthermore, Owner agrees that it shall not plead or raise as a defense the requirement of exhaustion of tribal court remedies and agrees not to sue Contractor or be sued by Contractor in the Tribal Court regarding any claims arising out of this Agreement.

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017.

§ 7.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A201–2017, then the Owner shall pay the Contractor a termination fee as follows:
(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)

« »

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

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§ 8.2 The Owner's representative:
(Name, address, email address, and other information)

« »
« »
« »
« »
« »
« »

§ 8.3 The Contractor's representative:
(Name, address, email address, and other information)

« »
« »
« »
« »
« »
« »

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

§ 8.5 Insurance and Bonds
§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A101™–2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with a building information modeling exhibit, if completed, or as otherwise set forth below:
(If other than in accordance with a building information modeling exhibit, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

« »

§ 8.7 Other provisions:

« »

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

.1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor

.2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds

.3 AIA Document A201™–2017, General Conditions of the Contract for Construction

.4 Building information modeling exhibit, dated as indicated below:
(Insert the date of the building information modeling exhibit incorporated into this Agreement.)

« »

.5 Drawings

Number	Title	Date

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.6 Specifications

Section	Title	Date	Pages

.7 Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

.8 Other Exhibits:
(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

[« »] AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017 incorporated into this Agreement.)

« »

[« »] The Sustainability Plan:

Title	Date	Pages

[« »] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

.9 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™–2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

« »

This Agreement entered into as of the day and year first written above.

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
« »« »	« »« »
(Printed name and title)	*(Printed name and title)*

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DRAFT

AIA® Document A101® – 2017 Exhibit A

Insurance and Bonds

This Insurance and Bonds Exhibit is part of the Agreement, between the Owner and the Contractor, dated the « » day of « » in the year « »
(In words, indicate day, month and year.)

for the following **PROJECT**:
(Name and location or address)

« »
« »

THE OWNER:
(Name, legal status and address)

«Coushatta Tribe of Louisiana
1940 CC Bell Road
Elton, LA 70532 »« »
« »

THE CONTRACTOR:
(Name, legal status and address)

« »« »
« »

TABLE OF ARTICLES

A.1 GENERAL

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A.4 SPECIAL TERMS AND CONDITIONS

ARTICLE A.1 GENERAL

The Owner and Contractor shall purchase and maintain insurance, and provide bonds, as set forth in this Exhibit. As used in this Exhibit, the term General Conditions refers to AIA Document A201™–2017, General Conditions of the Contract for Construction.

ARTICLE A.2 OWNER'S INSURANCE

§ A.2.1 General

Prior to commencement of the Work, the Owner shall secure the insurance, and provide evidence of the coverage, required under this Article A.2 and, upon the Contractor's request, provide a copy of the property insurance policy or policies required by Section A.2.3. The copy of the policy or policies provided shall contain all applicable conditions, definitions, exclusions, and endorsements.

§ A.2.2 Liability Insurance

The Owner shall be responsible for purchasing and maintaining the Owner's usual general liability insurance.

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document is intended to be used in conjunction with AIA Document A201®–2017, General Conditions of the Contract for Construction. Article 11 of A201®–2017 contains additional insurance provisions.

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§ A.2.3 Required Property Insurance

§ A.2.3.1 Unless this obligation is placed on the Contractor pursuant to Section A.3.3.2.1, the Owner shall purchase and maintain, from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located, property insurance written on a builder's risk "all-risks" completed value or equivalent policy form and sufficient to cover the total value of the entire Project on a replacement cost basis. The Owner's property insurance coverage shall be no less than the amount of the initial Contract Sum, plus the value of subsequent Modifications and labor performed and materials or equipment supplied by others. The property insurance shall be maintained until Substantial Completion and thereafter as provided in Section A.2.3.1.3, unless otherwise provided in the Contract Documents or otherwise agreed in writing by the parties to this Agreement. This insurance shall include the interests of the Owner, Contractor, Subcontractors, and Sub-subcontractors in the Project as insureds. This insurance shall include the interests of mortgagees as loss payees.

§ A.2.3.1.1 Causes of Loss. The insurance required by this Section A.2.3.1 shall provide coverage for direct physical loss or damage, and shall not exclude the risks of fire, explosion, theft, vandalism, malicious mischief, collapse, earthquake, flood, or windstorm. The insurance shall also provide coverage for ensuing loss or resulting damage from error, omission, or deficiency in construction methods, design, specifications, workmanship, or materials. Sub-limits, if any, are as follows:
(Indicate below the cause of loss and any applicable sub-limit.)

Causes of Loss	Sub-Limit

§ A.2.3.1.2 Specific Required Coverages. The insurance required by this Section A.2.3.1 shall provide coverage for loss or damage to falsework and other temporary structures, and to building systems from testing and startup. The insurance shall also cover debris removal, including demolition occasioned by enforcement of any applicable legal requirements, and reasonable compensation for the Architect's and Contractor's services and expenses required as a result of such insured loss, including claim preparation expenses. Sub-limits, if any, are as follows:
(Indicate below type of coverage and any applicable sub-limit for specific required coverages.)

Coverage	Sub-Limit

§ A.2.3.1.3 Unless the parties agree otherwise, upon Substantial Completion, the Owner shall continue the insurance required by Section A.2.3.1 or, if necessary, replace the insurance policy required under Section A.2.3.1 with property insurance written for the total value of the Project that shall remain in effect until expiration of the period for correction of the Work set forth in Section 12.2.2 of the General Conditions.

§ A.2.3.1.4 Deductibles and Self-Insured Retentions. If the insurance required by this Section A.2.3 is subject to deductibles or self-insured retentions, the Owner shall be responsible for all loss not covered because of such deductibles or retentions.

§ A.2.3.2 Occupancy or Use Prior to Substantial Completion. The Owner's occupancy or use of any completed or partially completed portion of the Work prior to Substantial Completion shall not commence until the insurance company or companies providing the insurance under Section A.2.3.1 have consented in writing to the continuance of coverage. The Owner and the Contractor shall take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of insurance, unless they agree otherwise in writing.

§ A.2.3.3 Insurance for Existing Structures

If the Work involves remodeling an existing structure or constructing an addition to an existing structure, the Owner shall purchase and maintain, until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, "all-risks" property insurance, on a replacement cost basis, protecting the existing structure against direct physical loss or damage from the causes of loss identified in Section A.2.3.1, notwithstanding the undertaking of the Work. The Owner shall be responsible for all co-insurance penalties.

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§ A.2.4 Optional Extended Property Insurance.
The Owner shall purchase and maintain the insurance selected and described below.
(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. For each type of insurance selected, indicate applicable limits of coverage or other conditions in the fill point below the selected item.)

[« »] **§ A.2.4.1 Loss of Use, Business Interruption, and Delay in Completion Insurance**, to reimburse the Owner for loss of use of the Owner's property, or the inability to conduct normal operations due to a covered cause of loss.

« »

[« »] **§ A.2.4.2 Ordinance or Law Insurance**, for the reasonable and necessary costs to satisfy the minimum requirements of the enforcement of any law or ordinance regulating the demolition, construction, repair, replacement or use of the Project.

« »

[« »] **§ A.2.4.3 Expediting Cost Insurance**, for the reasonable and necessary costs for the temporary repair of damage to insured property, and to expedite the permanent repair or replacement of the damaged property.

« »

[« »] **§ A.2.4.4 Extra Expense Insurance**, to provide reimbursement of the reasonable and necessary excess costs incurred during the period of restoration or repair of the damaged property that are over and above the total costs that would normally have been incurred during the same period of time had no loss or damage occurred.

« »

[« »] **§ A.2.4.5 Civil Authority Insurance**, for losses or costs arising from an order of a civil authority prohibiting access to the Project, provided such order is the direct result of physical damage covered under the required property insurance.

« »

[« »] **§ A.2.4.6 Ingress/Egress Insurance**, for loss due to the necessary interruption of the insured's business due to physical prevention of ingress to, or egress from, the Project as a direct result of physical damage.

« »

[« »] **§ A.2.4.7 Soft Costs Insurance**, to reimburse the Owner for costs due to the delay of completion of the Work, arising out of physical loss or damage covered by the required property insurance: including construction loan fees; leasing and marketing expenses; additional fees, including those of architects, engineers, consultants, attorneys and accountants, needed for the completion of the construction, repairs, or reconstruction; and carrying costs such as property taxes, building permits, additional interest on loans, realty taxes, and insurance premiums over and above normal expenses.

« »

§ A.2.5 Other Optional Insurance.
The Owner shall purchase and maintain the insurance selected below.

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(Select the types of insurance the Owner is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance.)

[« »] **§ A.2.5.1 Cyber Security Insurance** for loss to the Owner due to data security and privacy breach, including costs of investigating a potential or actual breach of confidential or private information. *(Indicate applicable limits of coverage or other conditions in the fill point below.)*

« »

[« »] **§ A.2.5.2 Other Insurance**
(List below any other insurance coverage to be provided by the Owner and any applicable limits.)

Coverage	Limits

ARTICLE A.3 CONTRACTOR'S INSURANCE AND BONDS

§ A.3.1 General

§ A.3.1.1 Certificates of Insurance. The Contractor shall provide certificates of insurance acceptable to the Owner evidencing compliance with the requirements in this Article A.3 at the following times: (1) prior to commencement of the Work; (2) upon renewal or replacement of each required policy of insurance; and (3) upon the Owner's written request. An additional certificate evidencing continuation of commercial liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the periods required by Section A.3.2.1 and Section A.3.3.1. The certificates will show the Owner as an additional insured on the Contractor's Commercial General Liability and excess or umbrella liability policy or policies.

§ A.3.1.2 Deductibles and Self-Insured Retentions. The Contractor shall disclose to the Owner any deductible or self-insured retentions applicable to any insurance required to be provided by the Contractor.

§ A.3.1.3 Additional Insured Obligations. To the fullest extent permitted by law, the Contractor shall cause the commercial general liability coverage to include (1) the Owner, the Architect, and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions for which loss occurs during completed operations. The additional insured coverage shall be primary and non-contributory to any of the Owner's general liability insurance policies and shall apply to both ongoing and completed operations. To the extent commercially available, the additional insured coverage shall be no less than that provided by Insurance Services Office, Inc. (ISO) forms CG 20 10 07 04, CG 20 37 07 04, and, with respect to the Architect and the Architect's consultants, CG 20 32 07 04.

§ A.3.2 Contractor's Required Insurance Coverage

§ A.3.2.1 The Contractor shall purchase and maintain the following types and limits of insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:
(If the Contractor is required to maintain insurance for a duration other than the expiration of the period for correction of Work, state the duration.)

« »

§ A.3.2.2 Commercial General Liability

§ A.3.2.2.1 Commercial General Liability insurance for the Project written on an occurrence form with policy limits of not less than «One Million Dollars » ($ «1,000,000 ») each occurrence, «Five Million dollars » ($ «5,000,000 ») general aggregate, and «Two Million Dollars » ($ «2,000,000 ») aggregate for products-completed operations hazard, providing coverage for claims including

.1 damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person;

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.2 personal injury and advertising injury;
.3 damages because of physical damage to or destruction of tangible property, including the loss of use of such property;
.4 bodily injury or property damage arising out of completed operations; and
.5 the Contractor's indemnity obligations under Section 3.18 of the General Conditions.

§ A.3.2.2.2 The Contractor's Commercial General Liability policy under this Section A.3.2.2 shall not contain an exclusion or restriction of coverage for the following:

.1 Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.
.2 Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.
.3 Claims for bodily injury other than to employees of the insured.
.4 Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured.
.5 Claims or loss excluded under a prior work endorsement or other similar exclusionary language.
.6 Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.
.7 Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.
.8 Claims related to roofing, if the Work involves roofing.
.9 Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.
.10 Claims related to earth subsidence or movement, where the Work involves such hazards.
.11 Claims related to explosion, collapse and underground hazards, where the Work involves such hazards.

§ A.3.2.3 Automobile Liability covering vehicles owned, and non-owned vehicles used, by the Contractor, with policy limits of not less than «One Million dollars » ($ «1,000,000 ») per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage.

§ A.3.2.4 The Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided such primary and excess or umbrella insurance policies result in the same or greater coverage as the coverages required under Section A.3.2.2 and A.3.2.3, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require the exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ A.3.2.5 Workers' Compensation at statutory limits.

§ A.3.2.6 Employers' Liability with policy limits not less than «One Million dollars » ($ «1,000,000 ») each accident, «One Million dollars » ($ «1,000,000 ») each employee, and «One Million dollars » ($ «1,000,000 ») policy limit.

§ A.3.2.7 Jones Act, and the Longshore & Harbor Workers' Compensation Act, as required, if the Work involves hazards arising from work on or near navigable waterways, including vessels and docks

§ A.3.2.8 If the Contractor is required to furnish professional services as part of the Work, the Contractor shall procure Professional Liability insurance covering performance of the professional services, with policy limits of not less than «One Million dollars- » ($ «1,000,000 ») per claim and «One Million dollars » ($ «1,000,000 ») in the aggregate.

§ A.3.2.9 If the Work involves the transport, dissemination, use, or release of pollutants, the Contractor shall procure Pollution Liability insurance, with policy limits of not less than «Two Million dollars » ($ «2,000,000 ») per claim and «Two Million dollars » ($ «2,000,000 ») in the aggregate.

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§ A.3.2.10 Coverage under Sections A.3.2.8 and A.3.2.9 may be procured through a Combined Professional Liability and Pollution Liability insurance policy, with combined policy limits of not less than «Five Million dollars » ($ «5,000,000 ») per claim and «Five Million dollars » ($ « 5,000,000 ») in the aggregate.

§ A.3.2.11 Insurance for maritime liability risks associated with the operation of a vessel, if the Work requires such activities, with policy limits of not less than « » ($ « ») per claim and « » ($ « ») in the aggregate.

§ A.3.2.12 Insurance for the use or operation of manned or unmanned aircraft, if the Work requires such activities, with policy limits of not less than « » ($ « ») per claim and « » ($ « ») in the aggregate.

§ A.3.3 Contractor's Other Insurance Coverage

§ A.3.3.1 Insurance selected and described in this Section A.3.3 shall be purchased from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Contractor shall maintain the required insurance until the expiration of the period for correction of Work as set forth in Section 12.2.2 of the General Conditions, unless a different duration is stated below:
(If the Contractor is required to maintain any of the types of insurance selected below for a duration other than the expiration of the period for correction of Work, state the duration.)

« »

§ A.3.3.2 The Contractor shall purchase and maintain the following types and limits of insurance in accordance with Section A.3.3.1.
(Select the types of insurance the Contractor is required to purchase and maintain by placing an X in the box(es) next to the description(s) of selected insurance. Where policy limits are provided, include the policy limit in the appropriate fill point.)

[« »] **§ A.3.3.2.1** Property insurance of the same type and scope satisfying the requirements identified in Section A.2.3, which, if selected in this section A.3.3.2.1, relieves the Owner of the responsibility to purchase and maintain such insurance except insurance required by Section A.2.3.1.3 and Section A.2.3.3. The Contractor shall comply with all obligations of the Owner under Section A.2.3 except to the extent provided below. The Contractor shall disclose to the Owner the amount of any deductible, and the Owner shall be responsible for losses within the deductible. Upon request, the Contractor shall provide the Owner with a copy of the property insurance policy or policies required. The Owner shall adjust and settle the loss with the insurer and be the trustee of the proceeds of the property insurance in accordance with Article 11 of the General Conditions unless otherwise set forth below:
(Where the Contractor's obligation to provide property insurance differs from the Owner's obligations as described under Section A.2.3, indicate such differences in the space below. Additionally, if a party other than the Owner will be responsible for adjusting and settling a loss with the insurer and acting as the trustee of the proceeds of property insurance in accordance with Article 11 of the General Conditions, indicate the responsible party below.)

« »

[« »] **§ A.3.3.2.2 Railroad Protective Liability Insurance**, with policy limits of not less than « » ($ « ») per claim and « » ($ « ») in the aggregate, for Work within fifty (50) feet of railroad property.

[« »] **§ A.3.3.2.3 Asbestos Abatement Liability Insurance**, with policy limits of not less than « » ($ « ») per claim and « » ($ « ») in the aggregate, for liability arising from the encapsulation, removal, handling, storage, transportation, and disposal of asbestos-containing materials.

[« »] **§ A.3.3.2.4** Insurance for physical damage to property while it is in storage and in transit to the construction site on an "all-risks" completed value form.

[« »] **§ A.3.3.2.5** Property insurance on an "all-risks" completed value form, covering property owned by the Contractor and used on the Project, including scaffolding and other equipment.

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[« »] **§ A.3.3.2.6 Other Insurance**

(List below any other insurance coverage to be provided by the Contractor and any applicable limits.)

Coverage	Limits

§ A.3.4 Performance Bond and Payment Bond

The Contractor shall provide surety bonds, from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located, as follows:
(Specify type and penal sum of bonds.)

Type	Penal Sum ($0.00)
Payment Bond	100% of the Contract Amount
Performance Bond	100% of the Contract Amount

Payment and Performance Bonds shall be AIA Document A312™, Payment Bond and Performance Bond, or contain provisions identical to AIA Document A312™, current as of the date of this Agreement.

ARTICLE A.4 SPECIAL TERMS AND CONDITIONS

Special terms and conditions that modify this Insurance and Bonds Exhibit, if any, are as follows:

« »

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SECTION 00 0590

CONTRACTING FORMS AND SUPPLEMENTS

PART 1 GENERAL

1.01 Contractor is responsible for obtaining a valid license to use all copyrighted documents specified but not included in the Project Manual.

1.02 AGREEMENT AND CONDTIONS OF THE CONTRACT

A. See Section 00500 for the Agreement form to be executed.

B. See Section 00700 for the General Conditions.

C. See Section 00800 for the Supplementary Conditions.

D. The Agreement is based on AIA 101.

E. The General Conditions are based on AIA A201.

1.03 FORMS

A. Use the following forms for the specified purposes unless otherwise indicated elsewhere in the Contract Documents.

B. Bond Forms:

C. Post-Award Certificates and Other Forms:

1. Submittal Transmittal Form: AIA G810.

2. Certificate of Insurance Form: Standard ACCORD forms are acceptable.

    a. Liability.

    b. Workers' Compensation.

    c. Automobile Liablilty.

3. Waiver of Subrogation and Severability of Interests Endorsement.

    a. The form follows this Section.

    b. The form shall accompany Certificates of Insurance.

4. Schedule of Values Form: AIA G703.

5. Application for Payment Form: AIA G702 and G703.

6. Sales Tax Form: A certificate from and by the office of the State Tax Commissioner showing that all taxes due and owing to the State of Louisiana have been paid.

7. Consent of Surety to Reduction of Retainage Form: AIA G707A.

D. Clarification and Modification Forms:

1. Change Order Form: AIA G701.

E. Closeout Forms:

1. Certificate of Substantial Completion Form: AIA G704.

2. Affidavit of Payments of Debts and Claims Form: AIA G706.

3. Affidavit of Release of Liens Form : AIA G706A.

4. Consent of Surety to Final Payment Form: AIA G707.

1.04 REFERENCE STANDARDS

A. AIA A101 – Standard Form of Agreement Between Owner and Contractor – Stipulated Sum;2017.

B. AIA A201 – General Conditions of the Contract for Construction; 2017.

C. AIA G701 – Change Order.

D. AIA G702 – Application and Certificate for Payment.

E. AIA G703 – Continuation Sheet.

F. AIA G704 – Certificate of Substantial Completion.

G. AIA G810 – Transmittal Letter.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION 00 0590

SECTION 00 0700

GENERAL CONDITIONS OF THE CONTRACT

GENERAL

1.01 GENERAL CONDITION OF THE CONTRACT FOR CONSTRUCTION

A. AIA Document A201-2017, General Conditions of the Contract for Construction, will be the document defining responsibilities of all parties during the project.

B. This form is hereby made part of the contract documents and is included in the Project Manual by reference only.

C. Original forms will be attached to the executed contract agreements.

1. Copies of these conditions are available for review from the Architect.

END OF SECTION 00 700

SECTION 00 0800

SUPPLEMENTARY GENERAL CONDITIONS

PART 1 ARTICLE 15

1.01 GENERAL

A. The General Conditions of the Contract for Construction (AIA Document Number A201, 2017 edition) are hereby made part of the Contract Documents whether bound herein or not. This Article 15 contains changes and additions to the AIA A201, cross referenced to the original article numbers in AIA A201. Where any part of AIA A201 is not modified or voided by this Article 15, the unaltered part remains in effect.

1.02 DEFINITIONS

Add the Following:

Build America, Buy America Act (BABAA) – Requirements instituted by the Bipartisan Infrastructure Law of 2021 mandating domestic preference that all iron and steel, manufactured products, and construction materials are produced in the United States.

Construction Materials – Those articles, materials, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives – that are or consist primarily of: nonferrous metals, plastic and polymer-based products, glass, lumber or drywall.

Manufactured Product – Items assembled out of components, or otherwise made or processed from raw materials into finished products. Manufactured products must be manufactured (assembled) in the United States, and the cost of components that were mined, produced, or manufactured in the United States must be greater than 55 percent of the total cost of all components of the project. Manufacturer's Certification – Documentation provided by a

Manufacturer, certifying that the items provided by Manufacturer meet the domestic preference requirements of BABAA.

PART 2 – MODIFICATIONS TO AIA A201

2.01 ARTICLE 1. – GENERAL PROVISIONS

Add the following:

1.2.4 The general character and scope of the Work is shown by the Drawings. Where a portion of the Work is fully drawn and the remainder is merely indicated, the portion fully drawn shall apply to all similar parts of the work.

1.2.5 Figured dimensions shall be followed in preference to scaled measurements. Dimensions on the Drawings are subject to field verification to suit adjacent elements.

1.2.6 Where Specifications are abbreviated type, they indicate complete sentences in the same manner as when a note occurs in the Drawings. Omissions of words such as “the Contractor shall” and “as shown on the Drawings” is intentional. The words “shall” or “shall be” are to be supplied by inference. The term “Provide” shall mean “furnish and install in place.”

1.2.7 Where a number is listed in the Specifications (as for gauges, weights, temperatures, amount of time, etc.) the number shall be interpreted as that or better.

2.02 ARTICLE 2. – OWNER

Add the following:

2.2.7: Where the Contract Documents affect an existing site or building, the Owner shall provide any copies of hazardous materials surveys to the Contractor upon request.

2.03 ARTICLE 3. – CONTRACTOR

Add the following:

3.2.4: Where the Contract Documents require Work better than that required by statute, the Contract Documents shall govern.

3.4.4 No trade shall commence Work until conditions are right for carrying out the Work properly, and substrates and surfaces which will receive additional surfaces and materials are suitable.

3.4.5 Manufacturer’s printed instructions covering including details of installation shall be followed where not in conflict with these Specifications. If there is a conflict, notify the Architect and obtain his approval before proceeding.

3.4.6 Completed Work shall be left plumb, level, true to line or plane, parallel to adjacent finishes, and anchored securely in place free from damage.

3.4.7 Unless otherwise called for, all pieces of material shall be as large a stock size as is in conformity with standard good practice of the trade.

3.4.8 Except where in conflict with these specifications, current manufacturer’s printed specifications of herein specified proprietary products are made part of these specifications.

3.7.1 Add the following sentence: “Value of fees shall be based on their base bid and alternates.”

Modify the original paragraph:

3.10.1: ADD: The Contractor shall prepare and amend the construction schedule and perform other duties of coordination and progress reporting specified in this manual, in cooperation with the other contractors and obtain written evidence of their concurrence. No payment will be certified on any contract util a progress schedule for all Work of the Contract has been provided to the Architect y the General Contractor.

Replace the original paragraph in its entirety with:

3.11.1 The Contractor shall maintain at the site one copy of all Drawings, Specifications, Addenda, approved Shop Drawings, change orders, and other Contract modifications. These

shall be available to the Architect during construction. One set of prints shall be kept in good condition and marked as the Work progresses by the Contractor in ink to show all differences of major concealed items from what is called for by the Contract Documents. This is to include such items as main pipes and conduit or changed structural members which cannot be observed on completion even with the use of access doors or removable panels. This set shall be turned over to the Architect at the time of final inspection.

Add the following:

3.19

All products must meet BABAA requirements. Contractor shall include Manufacturer's Certification for BABAA requirements with all applicable submittals. If a specific manufacture is used in the bidding, a statement that each applicable Manufacturer will comply with BABAA, must be included with the bid submission. Contractor shall comply with BABAA requirements, including coordination with manufacturers, distributors, and suppliers to correct deficiencies in any BABAA requirement and documentation.

Engineer/Architect approval of shop drawings or samples shall include review of BABAA documentation.

Contractor shall certify upon completion that all work and materials have complied with BABAA requirements.

For any change orders, Contractor shall provide BABAA compliant documentation for any new products or materials required by the change.

Installation of materials or products that are not compliant with BABAA requirements shall be considered defective work. An approved Manufacturer's Certification or waiver prior to items being delivered to the project site is required.

By submitting an application for payment, based in whole or in part on furnishing equipment or materials, Contractor certifies that such equipment and materials, to contractor's knowledge, are compliant with BABAA requirements.

2.04 ARTICLE 4. – ADMINISTRATION OF THE CONTRACT

Modify the original paragraph:

4.2.3 ADD: The Architect is not responsible for the acts or omissions of the Owner.

4.2.4 ADD: In the event of any direct communication between Owner and Contractor, which affect the performance or administration of the Contract, the essence of such communications shall be reduced to writing by the Owner, with a copy to the Architect.

2.05 ARTICLE 5. – SUBCONTRACTS

No Supplement

2.06 ARTICLE 6. – CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

No Supplement

2.07 ARTICLE 7. – CHANGES IN THE WORK

Add the following:

7.1.5 The Owner and the Architect are not responsible to give Notice of Change Orders to the Surety (if any).

2.08 ARTICLE 8. – TIME

Modify the original paragraph as follows:

8.1.3 ADD: Minor corrective Work and the replacement of defective Work or materials, and the adjustment of control apparatus will not delay the determination that the Contract is Substantially Complete. See paragraph 12.2.2. – After Substantial Completion.

8.3.2.1 Where time extensions are issued for reasons not related to increase in scope of work, no consideration will be given for additional compensation for General Condition costs associated with the project.

ADD:

8.3.4 The following will not be considered justifications for delays in the work or extensions of time unless due to one of the causes within paragraph 8.3.1.

Delay caused by Subcontractor or Supplier except if the Subcontractor or Supplier goes out of business and another Subcontractor or Supplier cannot be found in time to meet schedule.

Shortage of workmen.

2.09 ARTICLE 9. – PAYMENTS AND COMPLETION

Modify the original paragraph as follows:

9.3.1 Delete the sentence after the words “Schedule of Values.”

Add:

9.3.4 Except where the statutory requirements apply, progress payments shall be made monthly upon application, in the amount of 90% of the Work completed and materials stored as described in paragraph 9.3.2. For a Contract over $100 thousand, the Architect may authorize the payment of 100% of the amount completed after a total of 5% of the Contract amount has been retained, providing progress on the Work is in accordance with or ahead of the Contractor’s Progress Schedule and is otherwise satisfactory to the Architect, and if the Contractor has filed a Consent of Surety to Reduction in Retainage with the Architect.

Modify the original paragraph:

9.8.1 ADD: at 12:01 am on the Date of Substantial Completion, the Owner becomes responsible for the care and operation of the accepted Work.

2.10 ARTICLE 10. – PROTECTION OF PERSONS & PROPERTY

Add:

Contractor shall comply with the provisions of AIA Document A201 Article 10, Safety of Persons and Property. Contractor shall keep informed of and comply with all Federal, State, and local laws, regulations and other legal requirements governing safety, health, sanitation, and the performance of the contract in general. Contractor shall provide, inspect, and maintain all safeguards, safety devices, protective equipment, safety programs, and other needed actions reasonable and necessary to protect the life, health, and property of the Contractor, subcontractors, owner and the State, including their employees, officers, assigns, ad agents, and the public, in connection with the performance of the work covered by the contact.

For all contract for which the total estimated cost exceeds $100,000, Contractor shall submit to the owner a copy of the written safety program to be used as guidelines and direction for the Contractor's and subcontractor's worksite activities. This program must meet all Federal, State, and local laws and other legal requirements and include the following minimum provisions: (1) A worksite safety policy and mission statement; (2) assigned responsibilities among management, supervisors and employees; (3) a system for periodic self-inspections, including inspection of jobsites, materials work performance, and equipment; (4) a thorough accident and injury reporting and investigation process; (5) a safety orientation program including first aid, medial attention, emergency facilities, ire protection and prevention, housekeeping ,illumination, sanitation, personal protective equipment and occupational noise exposure; and (6) a safety training program including safety "tool box" meetings and other systems for ongoing training, including training for employees on the recognition, avoidance and prevention of unsafe conditions.

It shall be a condition of the Contract and shall be made a condition of each subcontract entered into pursuant to the contract, that the Owner assumes no liability relating to its receipt and review of the Contractor's Safety Plan. Safety remains the responsibility of the Contractor. Furthermore, the right of the Owner to receive and review the safety plan shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contactor or any other person or entity.

2.11 ARTICLE 11. – INSURANCE AND BONDS

11.1.2 Replace the text with:

This insurance shall be written for not less than the following limits of liability:

1. Commercial General and Liability Insurance written on an occurrence form with policy limits of not less than:
    a. $1,000,000 – each occurrence
    b. $5,000,000 – general aggregate
    c. $2,000,000 – aggregate for products-completed operations hazard, providing coverage for claims including:
        1. damages because of bodily injury, sickness or disease, including occupational sickness or disease, and death of any person

2. personal injury and advertising injury;
3. damages because of physical damage to or destruction of tangible property, including the loss of use of such property;
4. bodily injury or property damage arising out of completed operations; and
5. the Contractor's indemnity obligations under Section 3.18 of the General Conditions

2. Contractor's Commercial General Liability shall not contain an exclusion or restriction for the following:
    a. Claims by one insured against another insured, if the exclusion or restriction is based solely on the fact that the claimant is an insured, and there would otherwise be coverage for the claim.
    b. Claims for property damage to the Contractor's Work arising out of the products-completed operations hazard where the damaged Work or the Work out of which the damage arises was performed by a Subcontractor.
    c. Claims for bodily injury other than to employees of the insured.
    d. Claims for indemnity under Section 3.18 of the General Conditions arising out of injury to employees of the insured.
    e. Claims or loss excluded under a prior work endorsement or other similar exclusionary language.
    f. Claims or loss due to physical damage under a prior injury endorsement or similar exclusionary language.
    g. Claims related to residential, multi-family, or other habitational projects, if the Work is to be performed on such a project.
    h. Claims related to roofing, if the Work involves roofing.
    i. Claims related to exterior insulation finish systems (EIFS), synthetic stucco or similar exterior coatings or surfaces, if the Work involves such coatings or surfaces.
    j. Claims related to earth subsidence or movement, where the Work involves such hazards.
    k. Claims related to explosion, collapse and underground hazards, where the Work involves such hazards.

3. Automobile insurance, covering all owned, Non-owned, and Hired Vehicles, with policy limits not less than.

    a. $1,000,000 – per accident, for bodily injury, death of any person, and property damage arising out of the ownership, maintenance and use of those motor vehicles along with any other statutorily required automobile coverage.

        a. $1,000,000 - Aggregate

4. Worker's Compensation and Statutory limits:

    a. $1,000,000 – each accident

    b. $1,000,000 – each employee

c. $1,000,000 – policy limit

5. Contractor's Professional Liability if the Contractor is required to furnish professional services as part of the work:

   a. $1,000,000 – per claim

   b. $1,000,000 - Aggregate

6. Pollution Liability Insurance if the work involves transport, dissemination, use, or release of pollutants:

   a. $2,000,000 – per claim

   b. $2,000,000 – in the aggregate

7. Combined Professional Liability and Pollution Liability insurance policy, as an option, with combined policy limits of note less than

   a. $5,000,000 – per claim

   b. $5,000,000 - Aggregate

8. Additional insured endorsements shall contain a "Waiver of Subrogation."

The Architect and the Owner assume no responsibility in the event that the limits set above are note adequate.

Comprehensive General and Automobile Liability Policy form or policies shall be written by the same insurer who shall be a company licensed in the State of Louisiana where the work is located at the time the policy is issued. SCU Property Damage exclusions shall be eliminated in all cases where made applicable by the liability insurance classifications.

The Contractor shall procure and maintain, at a minimum, the above insurance limits during the term of the contract and for two years thereafter.

The aggregate limit shall apply separately to occurrences at the location or project to which the contract relates. The policy shall include a stop gap Employer's Liability endorsement to cover the employer's liability for injury to employees which fall outside of the state's Worker's Compensation Laws.

Automobile Liability Insurance covering all owned, non-owned and hired automobiles, trucks, and trailers. Such insurance shall provide coverage not less than that of the Standard Comprehensive Automobile Liability policy in limits not less than $1,000,000 combined single limit each occurrence for bodily injury and property damage.

Include other insurance deemed necessary by the Contractor, including but not limited to, coverage on contractor's or subcontractor's equipment.

The Owner and its agencies, officers, and employees (Coushatta Tribe of Louisiana) shall be endorsed on the commercial general liability policy and automobile liability policy as additional insureds. Contractor shall furnish certificates of insurance and copies of the additional insured endorsements prior to commencement of the contract. Endorsements shall contain a "Waiver of Subrogation" waiving any right of recovery the insurance companies may

have against the State as well as provisions that the policies and/or endorsements may not be canceled or modified without thirty days prior written notice to the Owner, and that any attorney who represents the Coushatta Tribe of Louisiana under the policy must first qualify and be appointed by the Louisiana Attorney General.

Contractor's insurance coverage shall be primary (i.e. pay first) as respects any insurance, self-insurance, or self-retention maintained by the Coushatta Tribe of Louisiana. Any insurance, self-insurance, or self-retention maintained by the State shall be in excess of the Contractor's insurance and shall not contribute with it.

The Insurance may be in policy or policies of insurance, primary and excess, including the so-called umbrella or catastrophe form and be place with insurers rated "a" or better by AM Best Company, Inc.

The Coushatta Tribe of Louisiana shall be indemnified and held harmless to the full extent of any coverage actually secured by the Contractor in excess of the minimum requirements set forth above.

All subcontractors shall maintain the same scope of insurance required of the Contractor. The General Contractor shall ensure compliance with this Requirement.

11.4.1 Replace the original paragraph in its entirety with:

11.4.1 Builder's Risk Insurance. The General Contractor shall effect and maintain "all risk" Builder's Risk insurance protection insuring the interest of the Owner, Contractor(s), and subcontractors of all tiers including coverage o all risk basis, including, but not limited tom coverage against fire, lightning, wind damage, hail, explosion, riot or civil commotions, aircraft and other vehicles, collapse and coverage under the so-called Installation Floater. The policy(ies) for such coverage shall be secured and maintained by the Contractor in an amount equal to the Fulle Completed Value of the Project. Any Deductible amounts under the policies shall be the sole responsibility of the General Contractor.

The General Contractor's bid shall include the Builder's Risk Premium on an amount equal to 100 percent of the base bid plus alternates, plus 75% of the base bid and alternates for other contracts, including the Architect's fee. The Contract amount shall be adjusted for the difference between the premium on this estimated amount and the actual amount.

Builder's Risk shall remain in effect until the building or project Substantial Completion and Certificate of Occupancy are processed.

The State Fire and Tornado Fund shall be contacted by the institution regarding additions to or remodeling of existing buildings to ascertain that adequate coverage for the existing building will be in effect should damage occur due to the contractor's work. Institutions should request permission from the State Insurance Commissioner for a State Fire and Tornado Fund waiver of subrogation prior to Construction.

The Owner, all Contractors and all Subcontractors, Architects and Engineers shall be named or designated in such capacity as insured jointly with the General Contractor in this policy or policies, which shall be open to any of the insured's inspection. The

Contractor shall accomplish this by having an appropriate rider added to all policies as follows:

"The (name of insurance company) does insure (names of Owner, Contractors, Architects, Engineers) and all other Contractors and Subcontractors with them at the described premises, but only to the extent of their individual interests, if any, as they may appear."

The insurance required by this Article shall be written by a Company licensed in the State where the Work is located at the time the policy is issued.

The insurance required by this Article shall remain in effect until the Date of Substantial Completion.

The Contract will not be signed until the Owner has received from the Contractor the proper policy and one copy thereof, for insurance specified under this Article.

If not covered under the all risk insurance or otherwise provided in the Contract Documents, the General Contractor shall effect and maintain similar property insurance on portions of the Work stored off the site or in transit when such portions of the Work are to be included in an Application for Payment under Subparagraph 9.3.2.

The "deductible" portion of the policy shall be paid by the General Contractor for al claims whether made y him or any one of the other named insured. The General Contractor is encouraged to maintain adequate security and take other precautionary steps as required to minimize the risks covered by this insurance.

All references in other sections of Article 11.4-=Property Insurance, that refer to the Owner as trustee for this type of insurance shall be hanged to place the General Contractor as Trustee.

Add the following:

11.5.3 The Contractor shall furnish a bond or bonds as described below, covering the faithful performance of the Contract and the payments of all obligations arising there under. The Contract will not be signed until the Owner has received the proper bond specified under this Article, issued by a bonding company licensed to do business in the state where the construction will take place.

A bid bond shall be required for submission of Bids.

A Performance/Payment Bond is required for this Contract:

a. Acknowledgement of Principal

b. Acknowledgement of Attorney-in-fact Surety.

11.5.4 If State or Federal bond forms are required by statute or regulation, the bond or bonds shall be on those forms, in the amount of 100% of the Contract Price.

11.5.5 Bond amounts shall not exceed the single bond limit for the Contractor's bonding company as set forth in the Federal Register current as of the bid date.

2.12 ARTICLE 12. – UNCOVERING AND CORRECTION OF WORK

No Supplement

2.13 ARTICLE 13. – MISCELLANEOUS PROVISIONS

Add the following:

13.8

Domestic Preference: Iron and steel products, Manufactured Products, and Construction Materials used in this project comply with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act (“IIJA”), Pub. L. 177-58.

2.14 ARTICLE 14. – TERMINATION OR SUSPENSION OF THE CONTRACT

No Supplement

END OF SECTION 00 0800

DRAFT

AIA® Document A201® – 2017

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)

« »
« »

THE OWNER:
(Name, legal status and address)

« »« »
« »

THE ARCHITECT:
(Name, legal status and address)

« »« »
« »

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding or proposal requirements.

§ 1.1.2 The Contract

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 The Work

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by Separate Contractors.

§ 1.1.5 The Drawings

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.6 The Specifications

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 Instruments of Service

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 Initial Decision Maker

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

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§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon written protocols governing the transmission and use of, and reliance on, Instruments of Service or any other information or documentation in digital form.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to written protocols governing the use of, and reliance on, the information contained in the model shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

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ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 Evidence of the Owner's Financial Arrangements

§ 2.2.1 Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.

§ 2.2.2 Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.

§ 2.2.3 After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.4 Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

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§ 2.3.4 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.3.5 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.3.6 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These

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obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

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§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

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§ 3.8.2 Unless otherwise provided in the Contract Documents,

.1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;

.2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and

.3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

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§ 3.12 Shop Drawings, Product Data and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional,

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whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

§ 3.13 Use of Site

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner and Architect with access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work,

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provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 4.1.2 Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the

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Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a Separate Contractor or the subcontractors of a Separate Contractor.

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§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work that the Contractor, by these Contract Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- **.1** assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and
- **.2** assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

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§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a Separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

§ 6.2.5 The Owner and each Separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

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§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor, and Architect stating their agreement upon all of the following:

- **.1** The change in the Work;
- **.2** The amount of the adjustment, if any, in the Contract Sum; and
- **.3** The extent of the adjustment, if any, in the Contract Time.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- **.1** Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- **.2** Unit prices stated in the Contract Documents or subsequently agreed upon;
- **.3** Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- **.4** As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

- **.1** Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
- **.2** Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;

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.3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;

.4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and

.5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

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§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

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§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- **.1** defective Work not remedied;
- **.2** third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- **.3** failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- **.4** reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

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.5 damage to the Owner or a Separate Contractor;
.6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
.7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

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§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

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§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- **.1** liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- **.2** failure of the Work to comply with the requirements of the Contract Documents;
- **.3** terms of special warranties required by the Contract Documents; or
- **.4** audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

- **.1** employees on the Work and other persons who may be affected thereby;

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.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and

.3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities

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proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the

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procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 Failure to Purchase Required Property Insurance. If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

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The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

§11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

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§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and

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approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.4.5 If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

- **.1** Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- **.2** An act of government, such as a declaration of national emergency, that requires all Work to be stopped;
- **.3** Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- **.4** The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

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§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- **.1** repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- **.2** fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- **.3** repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- **.4** otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- **.1** Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- **.2** Accept assignment of subcontracts pursuant to Section 5.4; and
- **.3** Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- **.1** that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or
- **.2** that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- **.1** cease operations as directed by the Owner in the notice;
- **.2** take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- **.3** except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

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§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the scheduled construction.

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§ 15.1.7 Waiver of Claims for Consequential Damages

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

.1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

.2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit, except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

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§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

§ 15.3.4 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 Arbitration

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

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§ 15.4.4 Consolidation or Joinder

§ 15.4.4.1 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.

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AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:
(Name, legal status and address)

« »« »
« »

SURETY:
(Name, legal status and principal place of business)

« »« »
« »

OWNER:
(Name, legal status and address)

« »« »
« »

BOND AMOUNT: $ « »

PROJECT:
(Name, location or address, and Project number, if any)

« »
« »
« »

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

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This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

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Signed and sealed this « » day of « » , « »

	« »
	(Contractor as Principal) *(Seal)*
	« »
(Witness)	*(Title)*
	« »
	(Surety) *(Seal)*
	« »
(Witness)	*(Title)*

DRAFT

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AIA® Document A312® – 2010

Payment Bond

CONTRACTOR:
(Name, legal status and address)

« »« »
« »

SURETY:
(Name, legal status and principal place of business)

« »« »
« »

OWNER:
(Name, legal status and address)

« »« »
« »

CONSTRUCTION CONTRACT
Date: « »
Amount: $ « »
Description:
(Name and location)

« »
« »

BOND
Date:
(Not earlier than Construction Contract Date)
« »
Amount: $ « »
Modifications to this Bond: « » None « » See Section 18

CONTRACTOR AS PRINCIPAL
Company: *(Corporate Seal)*

Signature: _____
Name and Title: « »« »

SURETY
Company: *(Corporate Seal)*

Signature: _____
Name and Title: « »« »

(Any additional signatures appear on the last page of this Payment Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)
AGENT or **BROKER:**

« »
« »
« »

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

« »
« »
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« »
« »
« »

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

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§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

- **.1** have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
- **.2** have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

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User Notes: (1933799778)

§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- **.1** the name of the Claimant;
- **.2** the name of the person for whom the labor was done, or materials or equipment furnished;
- **.3** a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- **.4** a brief description of the labor, materials or equipment furnished;
- **.5** the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- **.6** the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- **.7** the total amount of previous payments received by the Claimant; and
- **.8** the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

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User Notes: (1933799778)

§ 16.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

« »

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:	« »« »	Name and Title:	« »« »
Address:	« »	Address:	« »

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DRAFT

AIA® Document A312® – 2010

Performance Bond

CONTRACTOR:
(Name, legal status and address)

« »« »
« »

SURETY:
(Name, legal status and principal place of business)

« »« »
« »

OWNER:
(Name, legal status and address)

« »« »
« »

CONSTRUCTION CONTRACT
Date: « »
Amount: $ « »
Description:
(Name and location)

« »
« »

BOND
Date:
(Not earlier than Construction Contract Date)
« »
Amount: $ « »
Modifications to this Bond: **« »** None **« »** See Section 16

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:	« »« »	Name and Title:	« »« »

(Any additional signatures appear on the last page of this Performance Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or **BROKER:**

« »
« »
« »

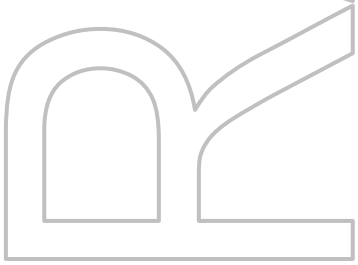
OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

« »
« »
« »
« »
« »
« »

ADDITIONS AND DELETIONS: The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.





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§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

.1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

.2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

.3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

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User Notes: (1698247510)

§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

.2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and

.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 Balance of the Contract Price. The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 Contractor Default. Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

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User Notes: (1698247510)

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

« »

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:	« »« »	Name and Title:	« »« »
Address:	« »	Address:	« »

DRAFT

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AIA® Document G701™ – 2017

Change Order

PROJECT: *(Name and address)*	**CONTRACT INFORMATION:** Contract For: Date:	**CHANGE ORDER INFORMATION:** Change Order Number: 001 Date:
OWNER: *(Name and address)*	**ARCHITECT:** *(Name and address)*	**CONTRACTOR:** *(Name and address)*

THE CONTRACT IS CHANGED AS FOLLOWS:
(Insert a detailed description of the change and, if applicable, attach or reference specific exhibits. Also include agreed upon adjustments attributable to executed Construction Change Directives.)

The original Contract Sum was	$	0.00
The net change by previously authorized Change Orders	$	0.00
The Contract Sum prior to this Change Order was	$	0.00
The Contract Sum will be increased by this Change Order in the amount of	$	0.00
The new Contract Sum including this Change Order will be	$	0.00

The Contract Time will be increased by Zero (0) days.
The new date of Substantial Completion will be

NOTE: This Change Order does not include adjustments to the Contract Sum or Guaranteed Maximum Price, or the Contract Time, that have been authorized by Construction Change Directive until the cost and time have been agreed upon by both the Owner and Contractor, in which case a Change Order is executed to supersede the Construction Change Directive.

NOT VALID UNTIL SIGNED BY THE ARCHITECT, CONTRACTOR AND OWNER.

ARCHITECT *(Firm name)*	**CONTRACTOR** *(Firm name)*	**OWNER** *(Firm name)*
SIGNATURE	**SIGNATURE**	**SIGNATURE**
PRINTED NAME AND TITLE	**PRINTED NAME AND TITLE**	**PRINTED NAME AND TITLE**
DATE	**DATE**	**DATE**

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AIA® Document G702® – 1992

Application and Certificate for Payment

TO OWNER:		**PROJECT:**		**APPLICATION NO:** 001	**Distribution to:**
					OWNER:
				PERIOD TO:	ARCHITECT:
				CONTRACT FOR:	CONTRACTOR:
FROM CONTRACTOR:		**VIA ARCHITECT:**		**CONTRACT DATE:**	FIELD:
				PROJECT NOS: / /	OTHER:

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract.
AIA Document G703®, Continuation Sheet, is attached.

1. ORIGINAL CONTRACT SUM	$0.00
2. NET CHANGE BY CHANGE ORDERS	$0.00
3. CONTRACT SUM TO DATE (Line 1 ± 2)	$0.00
4. TOTAL COMPLETED & STORED TO DATE (Column G on G703)	$0.00
5. RETAINAGE:	
a. 0 % of Completed Work (Column D + E on G703: $0.00)=	$0.00
b. 0 % of Stored Material (Column F on G703: $0.00)=	$0.00
Total Retainage (Lines 5a + 5b or Total in Column I of G703)	$0.00
6. TOTAL EARNED LESS RETAINAGE (Line 4 Less Line 5 Total)	$0.00
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT (Line 6 from prior Certificate)	$0.00
8. CURRENT PAYMENT DUE	$0.00
9. BALANCE TO FINISH, INCLUDING RETAINAGE (Line 3 less Line 6)	$0.00

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	$0.00	$0.00
Total approved this Month	$0.00	$0.00
TOTALS	$0.00	$0.00
NET CHANGES by Change Order		$0.00

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:

By: _____ Date: _____

State of:
County of:
Subscribed and sworn to before me this day of
Notary Public:
My Commission expires:

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED $0.00

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT:

By: _____ Date: _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

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User Notes:
(1753532791)

DRAFT

AIA® Document G704® – 2017

Certificate of Substantial Completion

PROJECT: *(name and address)*	**CONTRACT INFORMATION:** Contract For: Date:	**CERTIFICATE INFORMATION:** Certificate Number: 001 Date:
OWNER: *(name and address)*	**ARCHITECT:** *(name and address)*	**CONTRACTOR:** *(name and address)*

The Work identified below has been reviewed and found, to the Architect's best knowledge, information, and belief, to be substantially complete. Substantial Completion is the stage in the progress of the Work when the Work or designated portion is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. The date of Substantial Completion of the Project or portion designated below is the date established by this Certificate.
(Identify the Work, or portion thereof, that is substantially complete.)

ARCHITECT *(Firm Name)*	**SIGNATURE**	**PRINTED NAME AND TITLE**	**DATE OF SUBSTANTIAL COMPLETION**

WARRANTIES
The date of Substantial Completion of the Project or portion designated above is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below:
(Identify warranties that do not commence on the date of Substantial Completion, if any, and indicate their date of commencement.)

WORK TO BE COMPLETED OR CORRECTED
A list of items to be completed or corrected is attached hereto, or transmitted as agreed upon by the parties, and identified as follows:
(Identify the list of Work to be completed or corrected.)

The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Unless otherwise agreed to in writing, the date of commencement of warranties for items on the attached list will be the date of issuance of the final Certificate of Payment or the date of final payment, whichever occurs first.
The Contractor will complete or correct the Work on the list of items attached hereto within ( ) days from the above date of Substantial Completion.

Cost estimate of Work to be completed or corrected: $

The responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work, insurance, and other items identified below shall be as follows:
(Note: Owner's and Contractor's legal and insurance counsel should review insurance requirements and coverage.)

The Owner and Contractor hereby accept the responsibilities assigned to them in this Certificate of Substantial Completion:

CONTRACTOR *(Firm Name)*	**SIGNATURE**	**PRINTED NAME AND TITLE**	**DATE**
OWNER *(Firm Name)*	**SIGNATURE**	**PRINTED NAME AND TITLE**	**DATE**

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User Notes: (3B9ADA35)

NELSON
901 Marquette Ave., Suite 2850
Minneapolis, MN 55402

ARCHITECT'S CERTIFICATION OF NO CHANGE IN FEDERAL CONTRACT DOCUMENTS

This is to certify that no change (alterations, modifications, or deletions) have been made in the reproduction of USDA, Rural Development Standard Contract Documents, with the exception of the following:

None

Architect Name: Robert Sullivan
Firm: NELSON
Date: 5/30/2025

ATTACHMENT TO AIA DOCUMENT A701-2018, *Instructions to Bidders*

The provisions of this Attachment shall delete, modify and supplement the provisions contained in the "*Instructions to Bidders*", AIA Document A701-2018 Edition. The provisions contained in this Attachment will supersede any conflicting provisions of the AIA Document. The term "Agency", as used in this Attachment, shall mean the United States of America, acting through the United States Department of Agriculture.

When the project is not subject to the Build America, Buy America Act the provisions in bold do not apply.

ARTICLE 1, DEFINITIONS

Add the following paragraphs and subparagraphs:

1.10 Build America, Buy America Act (BABAA) – Requirements instituted by the Bipartisan Infrastructure Law of 2021 mandating domestic preference that all iron and steel, manufactured products, and construction materials are produced in the United States.

1.10.1 Construction Materials – Those articles, materials, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives – that are or consist primarily of: non-ferrous metals, plastic and polymer-based products, glass, lumber or drywall.

1.10.2 Manufactured Product – Items assembled out of components, or otherwise made or processed from raw materials into finished products. Manufactured products must be manufactured (assembled) in the United States, and the cost of components that were mined, produced, or manufactured in the United States must be greater than 55 percent of the total cost of all components of the project.

1.10.3 Manufacturer's Certification – Documentation provided by a Manufacturer, certifying that the items provided by Manufacturer meet the domestic preference requirements of BABAA.

ARTICLE 2, BIDDER'S REPRESENTATIONS

Add the following clauses to paragraph 2.1:

.7 This Bid has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this Bid, with any other Bidder or with any competitor.

.8 Bidder is familiar with all laws and regulations that may affect cost, progress, and performance of the work; **including BABAA requirements.**

ARTICLE 3, BIDDING DOCUMENTS

Add the following sentence to the end of subparagraph 3.3.1: "Any request for substitute or "or equal" shall include the Manufacturer's Certification of compliance with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L.177-58".

ARTICLE 4, BIDDING PROCEDURES

Add the following sentence to the end of subparagraph 4.1.1:

"Only one copy of the Bid is to be submitted".

Delete subparagraph 4.2.1 in its entirety and substitute the following:

4.2.1 Each Bid must be accompanied by a Bid Bond payable to the Owner for 5% of the total amount of the Bid.

Delete the last sentence of subparagraph 4.2.4 and substitute the following:

"However, if no Contract has been awarded or a Bidder has not been notified of the acceptance of its Bid, a Bidder may withdraw its Bid and request the return of its bid security beginning 60 days after the opening of Bids, unless a different period of time is mandated by State Law." Should there be reasons why the Contract cannot be awarded within the specified period, the time may be extended, by mutual agreement between the Owner and the Bidder, and the concurrence of the Agency.

Add the following subparagraphs and clauses to paragraph 4.3:

4.3.6 All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the Project, shall apply to the Contract throughout.

4.3.7 The Bidder agrees to abide by the requirements of Executive Order 11246, specifically including the provisions of the Equal Opportunity Clause and the Standard Federal Equal Employment Construction Contract Specifications set forth in the Supplementary Conditions.

4.3.8 The Bidder agrees to abide by the requirements of section 319 of Public Law 101-121, which pertains to lobbying activities and applies to recipients of contracts or subcontracts that exceed $100,000 at any tier under a Federal loan that exceeds $150,000 or a Federal grant that exceeds $100,000. Each Bid

shall be accompanied by a completed lobbying certification form identical to that included in the Bidding Documents.

4.3.9 The Bidder agrees to abide by the requirements under 2 CFR Part 417, which pertains to the debarment or suspension of a person from participating in a Federal program or activity.

4.3.10 This Bid is for services related to a project that is subject to the Build America, Buy America Act (BABAA) requirements under Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58. Absent an approved waiver, all iron, steel, manufactured products, and construction materials used in this project must be produced in the United States, as further outlined by the Office of Management and Budget's regulation (reference 2 CFR 200) on the application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure.

4.3.11 Under these Bidding Instructions, all Bidders (Contractors / Subcontractors) shall be responsible for:

.1 Providing bids that reflect compliance with BABAA requirements.

.2 Providing only iron, steel, construction materials and manufactured products that meet BABAA requirements. Installation of materials or products that are not compliant with BABAA requirements shall be considered defective work.

.3 Including manufacturer's certification for BABAA requirements with all applicable submittals. If a specific manufacturer is used in the bidding, a statement that the manufacturer will comply with BABAA requirements must be included with the bid submission. Contractor shall comply with BABAA requirements, including coordination with manufacturers, distributors, and suppliers to correct deficiencies in any BABAA documentation.

.4 Providing manufacturer's certification for BABAA requirements with any change order for any new construction materials or manufactured products required by the change.

.5 Certifying by submitting an application for payment, based in whole or in part on furnishing construction materials or manufactured products; that such materials and products, to the Contractor's, knowledge, are compliant with BABAA requirements.

.6 Ensuring that the Architect / Engineer has been provided an approved manufacturer's certification or

waiver prior to items being delivered to the project site.

.7 Certifying upon completion that all work and materials are in compliance with BABAA requirements.

Add the following terms and conditions to subparagraph 4.4.3:

The Owner keep the bid security provided by the Bidder.

ARTICLE 5, CONSIDERATION OF BIDS

Delete subparagraph 5.3.2 in its entirety and substitute the following:

5.3.2 The Owner shall have the right to accept Alternates in the sequence or combinations listed and to determine the low Bidder on the basis of the sum of the Base Bid and the Alternates accepted.

ARTICLE 7, PERFORMANCE BOND AND PAYMENT BOND

Delete subparagraph 7.1.1 in its entirety and substitute the following:

7.1.1 Prior to execution of the Contract, the Bidder shall furnish Bonds covering the faithful performance of the Contract and the payment of all obligations arising thereunder. Both Bonds shall be separately written, each in the amount of the Contract Sum with Power of Attorney attached naming "The United States of America, acting through the United States Department of Agriculture, Rural Development" as co-obligee. The cost shall be included in the Bid.

Delete subparagraph 7.1.3 in its entirety and substitute the following:

7.1.3 Surety companies executing Bonds must hold a certificate of authority as a acceptable surety on Federal Bonds as listed in Treasury Circular 570, as amended, and be authorized to transact business in the State where the Project is located.

Delete subparagraph 7.2.1 in its entirety and substitute the following:

7.2.1 The Bidder to whom the Contract is awarded will be required to execute the Agreement and obtain Performance and Payment Bonds, if required, within ten (10) calendar days from the date when the Notice of Award is delivered to the Bidder. The Notice shall be accompanied by the necessary Agreement.

Delete subparagraph 7.2.2 in its entirety and substitute the following:

7.2.2 The Bonds shall be written on forms identical to those included in the Bidding Documents.

ARTICLE 8, ENUMERATION OF CONTRACT DOCUMENTS

The following documents should be referenced, if applicable; in paragraph 8.1, clause .9:

Attachment to the *Standard Form of Agreement Between Owner and Contractor* (RD Instruction 1942-A, Guide 27, Attachment 3)
Attachment to the General Conditions of the Contract for Construction (RD Instruction 1942-A, Guide 27, Attachment 4)
Special Conditions
Invitation for Bids (Form RD 1924-5)
Instructions to Bidders, AIA A701-2018
Attachment to the Instructions to Bidders (this attachment)
Bid Form
Bid Bond
EEO Compliance Statement (Form RD 400-6)
Payment Bond
Performance Bond
Certification for Contracts, Grants and Loans (RD Instruction 1940-Q, Exhibit A-1)

(Note: Any additional provisions that are necessary to remain effective after execution of the Contract for Construction will be inserted here and continue in the same format.)

o0o

LOUISIANA UNIFORM PUBLIC WORK BID FORM

TO: _____ **BID FOR:** _____

_____ _____

_____ _____

_____ _____

(Owner to provide name and address of owner) (*Owner to provide name of project and other identifying information)*

The undersigned bidder hereby declares and represents that she/he; a) has carefully examined and understands the Bidding Documents, b) has not received, relied on, or based his bid on any verbal instructions contrary to the Bidding Documents or any addenda, c) has personally inspected and is familiar with the project site, and hereby proposes to provide all labor, materials, tools, appliances and facilities as required to perform, in a workmanlike manner, all work and services for the construction and completion of the referenced project, all in strict accordance with the Bidding Documents prepared by: _____ _____ and dated: _____

(Owner to provide name of entity preparing bidding documents.)

Bidders must acknowledge all addenda. The Bidder acknowledges receipt of the following **ADDENDA:** (Enter the number the Designer has assigned to each of the addenda that the Bidder is acknowledging) _____ .

TOTAL BASE BID: For all work required by the Bidding Documents (including any and all unit prices designated "Base Bid" * but not alternates) the sum of:

_____ Dollars ($ _____)

ALTERNATES: For any and all work required by the Bidding Documents for Alternates including any and all unit prices designated as alternates in the unit price description.

Alternate No. 1 *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:

_____ Dollars ($ _____)

Alternate No. 2 *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:

_____ Dollars ($ _____)

Alternate No. 3 *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:

_____ Dollars ($_____)

NAME OF BIDDER: _____

ADDRESS OF BIDDER: _____

_____

LOUISIANA CONTRACTOR'S LICENSE NUMBER: _____

NAME OF AUTHORIZED SIGNATORY OF BIDDER: _____

TITLE OF AUTHORIZED SIGNATORY OF BIDDER: _____

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER **: _____

DATE: _____

THE FOLLOWING ITEMS ARE TO BE INCLUDED WITH THE SUBMISSION OF THIS LOUISIANA UNIFORM PUBLIC WORK BID FORM:

* The Unit Price Form shall be used if the contract includes unit prices. Otherwise it is not required and need not be included with the form. The number of unit prices that may be included is not limited and additional sheets may be included if needed.

**** A CORPORATE RESOLUTION OR WRITTEN EVIDENCE** of the authority of the person signing the bid for the public work as prescribed by LA R.S. 38:2212(B)(5).

BID SECURITY in the form of a bid bond, certified check or cashier's check as prescribed by LA R.S. 38:2218(A) attached to and made a part of this bid.

LOUISIANA UNIFORM PUBLIC WORK BID FORM
UNIT PRICE FORM

TO: _____ **BID FOR:** _____

(Owner to provide name and address of owner)

(Owner to provide name of project and other identifying information)

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amounts shall be stated in figures and only in figures.

DESCRIPTION:	❑ Base Bid or ❑ Alt.# ___			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*

DESCRIPTION:	❑ Base Bid or ❑ Alt.# ___			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*

DESCRIPTION:	❑ Base Bid or ❑ Alt.# ___			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*

DESCRIPTION:	❑ Base Bid or ❑ Alt.# ___			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*

DESCRIPTION:	❑ Base Bid or ❑ Alt.# ___			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*

DESCRIPTION:	❑ Base Bid or ❑ Alt.# ___			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*

DESCRIPTION:	❑ Base Bid or ❑ Alt.# ___			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*

DESCRIPTION:	❑ Base Bid or ❑ Alt.# ___			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION *(Quantity times Unit Price)*

Wording for "DESCRIPTION" is to be provided by the Owner.
All quantities are estimated. The contractor will be paid based upon actual quantities as verified by the Owner

BID

Proposal of _____ (hereinafter called "BIDDER"), organized and existing under the laws of the State of _____ doing business as _____*. To the _____ _____ (hereinafter called "OWNER").

In compliance with your Advertisement for Bids, BIDDER hereby proposes to perform all WORK for the construction of _____ _____ in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

By submission of this BID, each BIDDER certifies, and in the case of a joint BID each party thereto certifies as to its own organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

BIDDER hereby agrees to commence WORK under this contract on or before a date to be specified in the NOTICE TO PROCEED and to fully complete the PROJECT within _____ consecutive calendar days thereafter. BIDDER further agrees to pay as liquidated damages, the sum of $_____ for each consecutive calendar day thereafter as provided in Section 15 of the General Conditions.

BIDDER acknowledges receipt of the following ADDENDUM:

_____

_____

_____

* Insert "a corporation", "a partnership", or "an individual" as applicable.

BIDDER agrees to perform all the work described in the CONTRACT DOCUMENTS for the following unit prices or lump sum:

BID SCHEDULE

NOTE: BIDS shall include sales tax and all other applicable taxes and fees.

NO.	ITEM	UNIT	UNIT PRICE	AMOUNT	TOTAL PRICE

NO.	ITEM	UNIT	UNIT PRICE	AMOUNT	TOTAL PRICE

TOTAL OF BID . . . . . $_____
LUMP SUM PRICE (if applicable) . . . . . $_____

Respectfully submitted:

_____ _____
Signature Address

_____ _____
Title Date

_____ _____
License number (if applicable)

SEAL - (if BID is by a corporation)

(1-15-79) SPECIAL PN

USDA
Form RD 400-6
(Rev. 4-00)

Form Approved
OMB No. 0575-0018

COMPLIANCE STATEMENT

This statement relates to a proposed contract with _____

_____
(Name of borrower or grantee)

who expects to finance the contract with assistance from either the Rural Housing Service (RHS), Rural Business-Cooperative Service (RBS), or the Rural Utilities Service (RUS) or their successor agencies, United States Department of Agriculture (whether by a loan, grant, loan insurance, guarantee, or other form of financial assistance). I am the undersigned bidder or prospective contractor, I represent that:

1. ☐ I have, ☐ have not, participated in a previous contract or subcontract subject to Executive 11246 (regarding equal employment opportunity) or a preceding similar Executive Order.

2. If I have participated in such a contract or subcontract, ☐ I have, ☐ have not, filed all compliance reports that have been required to file in connection with the contract or subcontract.

If the proposed contract is for $50,000 or more and I have 50 or more employees, I also represent that:

3. ☐ I have, ☐ have not previously had contracts subject to the written affirmative action programs requirements of the Secretary of Labor.

4. If I have participated in such a contract or subcontract, ☐ I have, ☐ have not developed and placed on file at each establishment affirmative action programs as required by the rules and regulations of the Secretary of Labor.

I understand that if I have failed to file any compliance reports that have been required of me, I am not eligible and will not be eligible to have my bid considered or to enter into the proposed contract unless and until I make an arrangement regarding such reports that is satisfactory to either the RHS, RBS or RUS, or to the office where the reports are required to be filed.

I also certify that I do not maintain or provide for my employees any segregated facilities at any of my establishments, and that I do not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I certify further that I will not maintain or provide for my employees any segregated facilities at any of my establishments, and that I will not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I agree that a breach of this certification is a violation of the Equal Opportunity clause in my contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and wash rooms, restaurants and other eating areas time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. I further agree that (except where I have obtained identical certifications for proposed subcontractors for specific time periods) I will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause; that I will retain such certifications in my files; and that I will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods): (See Reverse).

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays the valid OMB control number. The valid OMB control number for this information collection is 0575-0018. The time required to complete this information collection is estimated to average 10 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENTS FOR CERTIFICATIONS OF NON-SEGREGATED FACILITIES

A certification of Nonsegregated Facilities, as required by the May 9, 1967, order (32F.R. 7439, may 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a subcontract exceeding $ 10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

Date _____ _____

(Signature of Bidder or Prospective Contractor)

_____

Address (including Zip Code)

ATTACHMENT TO AIA DOCUMENT A101-2017, *Standard Form of Agreement Between Owner and Contractor*

The provisions of this Attachment shall delete, modify and supplement the provisions contained in the "*Standard Form of Agreement Between Owner and Contractor*," AIA Document A101-2017 Edition. The provisions contained in this attachment shall supersede any conflicting provisions of the AIA Document. The term "Agency", as used in this Attachment, shall mean the United States of America, acting through the United States Department of Agriculture.

When the project is not subject to the Build America, Buy America Act the provisions in bold do not apply.

ARTICLE 3, DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

Delete paragraph 3.1 and associated option boxes in their entirety and replace with the following:

> 3.1 The date of commencement shall be contained in the Notice to Proceed.

Replace subparagraph 3.3.3 with the following:

> 3.3.3 If the work is not substantially complete on or before this date, or within this period of time, or extension thereof granted by the Owner, damage will be sustained by the Owner and that it is and will be impracticable and extremely difficult to fix the actual damage which the Owner will sustain in the event of and by reason of such delays. The Contractor shall pay to the Owner liquidated damages in the sum of $_____ for each calendar day of delay. Any sums that may be due the Owner as liquidated damages may be deducted from any monies due or to become due the Contractor under the Contract or may be collected from the Contractor's surety.

ARTICLE 5, PAYMENTS

Add the following after the words "Payment issued by the Architect" in subparagraph 5.1.1: "using AIA Document G702, 'Application and Certificate for Payment,' or Form RD 1924-18, 'Partial Payment Estimate'".

Add the following to the end of subparagraph 5.1.1: "Agency concurrence is required on all Applications of Payment before payment is made".

Insert "ten" and "10" in the appropriate spaces in the last sentence in subparagraph 5.1.3.

Insert the following retainage description and clauses in subparagraph 5.1.7.1:

> The amount retained shall be 10% of the value of Work until 50% of the Work has been completed or a withholding of equal or

greater value, such as, 5% for the full duration of the project. If 10% is held, at 50% completion, further partial payments shall be made in full to the Contractor and no additional amounts may be retained unless the Architect certifies that the Work is not proceeding satisfactorily but amounts previously retained shall not be paid to the Contractor. At 50% completion or any time thereafter when the progress of the Work is not satisfactory, additional amounts may be retained, but in no event shall the total retainage be more than 10% of the value of Work completed. Alternate industry-standard retainage proposals may be considered by RD when:

.1 The retainage proposal is mandated by the State in which the project is located.

.2 The retainage proposal does not add risk to the applicant and the Agency.

ARTICLE 8, MISCELLANEOUS PROVISIONS

Add the following subparagraphs and clauses to paragraph 8.7:

8.7.1 This agreement and any amendments to this agreement shall not be in full force and effect until concurred with in writing by a duly authorized representative of the Agency. The concurrence so evidenced by the Agency shall in no way commit the Agency to render financial assistance to the Owner and is without liability to the Agency for any payment thereunder, but in the event such assistance is provided, the concurrence shall signify that the provisions of this Agreement and any amendments to this Agreement are consistent with Agency requirements.

8.7.2 Build America, Buy America Act

***Domestic Preference Requirements for Federal Financial Assistance to Non-Federal Entities*. Federal Financial Assistance to Non-Federal Entities, defined pursuant to 2 CFR 200.1 as any State, local government, Indian tribe, Institution of Higher Education, or nonprofit organization, shall be governed by the requirements of Section 70914 of the Build America, Buy America Act (BABAA), under Title IX of the Infrastructure Investment and Jobs Act, Pub. L. 177-58. Any requests for waiver of these requirements must be submitted pursuant to USDA's guidance available online at USDA Buy America Waivers for Federal Financial Assistance | USDA.**

8.7.2.1 This agreement is for services related to a project that is subject to the Build America, Buy America Act (BABAA) requirements under Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58. Absent an approved waiver, all iron, steel, manufactured products, and construction materials used in this project must be produced in the United States, as further outlined by the Office of Management and Budget's regulation (reference 2 CFR 200) on the application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure.

8.7.2.2 The Contractor shall be responsible for:

.1 Providing costs and revisions thereof that reflect compliance with BABAA requirements.

.2 Providing only iron, steel, construction materials and manufactured products that meet BABAA requirements. Installation of materials or products that are not compliant with BABAA requirements shall be considered defective work.

.3 Including manufacturer's certification for BABAA requirements with all applicable submittals. If a specific manufacturer is used in the bidding, a statement that the manufacturer will comply with BABAA requirements must be included with the bid submission. Contractor shall comply with BABAA requirements, including coordination with manufacturers, distributors, and suppliers to correct deficiencies in any BABAA documentation.

.4 Providing manufacturer's certification for BABAA requirements with any change order for any new construction materials or manufactured products required by the change.

.5 Certifying by submitting an application for payment, based in whole or in part on furnishing construction materials or manufactured products; that such materials and products, to the Contractor's knowledge, are compliant with BABAA requirements.

.6 Ensuring that the Architect / Engineer has been provided an approved manufacturer's certification or waiver prior to items being delivered to the project site.

.7 Certifying upon completion that all work and materials are in compliance with BABAA requirements.

ARTICLE 9, ENUMERATION OF CONTRACT DOCUMENTS

The following documents should be referenced, if applicable; in paragraph 9.1, clause .9:

Attachment to the *Standard Form of Agreement Between Owner and Contractor* (this Attachment)
Attachment to the General Conditions of the Contract for Construction (RD Instruction 1942-A, Guide 27, Attachment 4)
Advertisement For Bids (RD Instruction 1942-A, Guide 19, Attachment 1)
Instructions to Bidders, AIA A701-2018
Attachment to the Instructions to Bidders (RD Instruction 1942-A, Guide 27, Attachment 2)
Bid Form
Bid Bond
Payment Bond
Performance Bond
Certification for Contracts, Grants and Loans (RD Instruction 1940-Q, Exhibit A-1)
Disclosure of Lobbying Activities (Form SF-LLL)
Compliance Statement (Form RD 400-6)

PAGE 8, OWNER AND CONTRACTOR SIGNATURE PAGE

Delete the signature block and replace with the following:

IN WITNESS WHEREOF, the parties hereto have executed, or caused to be executed by their duly authorized officials, this Agreement in duplicate on the respective dates indicated below:

OWNER:

ATTEST: _____ By _____

Type Name _____ Type Name _____

Title _____ Title _____

Date _____ Date _____

CONTRACTOR:

ATTEST: _____ By _____

Type Name _____ Type Name _____

Title _____ Title _____

Date _____ Date _____

AGENCY CONCURRENCE:

By _____

Type Name _____

Title _____

Date _____

The concurrence so evidenced by the Agency shall in no way commit the Agency to render financial assistance to the Owner and is without liability to the Agency for any payment hereunder, but in the event such assistance is provided, the concurrence shall signify the provisions of this Agreement are consistent with Agency requirements.

o0o

U.S. DEPARTMENT OF AGRICULTURE

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 7 CFR Part 3017, Section 3017.510, Participants' responsibilities. The regulations were published as Part IV of the January 30, 1989, **Federal Register** (pages 4722-4733). Copies of the regulations may be obtained by contacting the Department of Agriculture agency with which this transaction originated.

(BEFORE COMPLETING CERTIFICATION, READ INSTRUCTIONS ON REVERSE)

(1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

(2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

Organization Name

PR/Award Number or Project Name

Name(s) and Title(s) of Authorized Representative(s)

Signature(s)

Date

Form AD-1048 (1/92)

Instructions for Certification

1. By signing and submitting this form, the prospective lower tier participant is providing the certification set out on the reverse side in accordance with these instructions.

2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

4. The terms "covered transaction," "debarred," "suspended," "ineligible," " lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

5. The prospective lower tier participant agrees by submitting this form that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

6. The prospective lower tier participant further agrees by submitting this form that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

Form AD-1048 (1/92)

U.S. GPO: 1996-757-776/201 07

14. Certificate of Owner's Attorney.

I, the undersigned, _____ , the duly authorized and acting legal representative of_____ _____, do hereby certify as follows

I have examined the attached contract(s) and performance and payment bond(s) and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements are adequate and have has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with terms, conditions, and provisions thereof.

_____

Date:_____

NOTE: Delete phrase "performance and payment bonds" when not applicable.

RD Instruction 1942-A
(Guide 19 - Attachment 7)

NOTICE OF AWARD

TO:_____
_____
_____
_____

PROJECT Description:_____
_____
_____

The OWNER has considered the BID submitted by you for the above described WORK in response to its Advertisement for Bids dated _____, 19_____, and Information for Bidders.

You are hereby notified that your BID has been accepted for items in the amount of $_____.

You are required by the Information for Bidders to execute the Agreement and furnish the required CONTRACTOR'S Performance BOND, Payment BOND and certificates of insurance within ten (10) calendar days from the date of this Notice to you.

If you fail to execute said Agreement and to furnish said BONDS within ten (10) days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER's acceptance of your BID as abandoned and as a forfeiture of your BID BOND. The OWNER will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER.

Dated this_____ day of_____, 19____.

_____
Owner

By_____

Title_____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged

by_____.
this the_____ day of_____, 19_____.
By_____
Title_____

NOTICE TO PROCEED

TO: _____ DATE: _____

_____ Project: _____

_____ _____

_____ _____

You are hereby notified to commence WORK in accordance with the Agreement dated _____, 19___, on or before _____, 19__, and you are to complete the WORK within _____ consecutive calendar days thereafter. The date of completion of all WORK is therefore _____, 19__.

_____
Owner

By _____

Title_____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED is hereby acknowledged by _____

_____,

this the_____, 19_____

_____

By_____

Title_____

Employer Identification Number_____

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ATTACHMENT TO AIA DOCUMENT A201-2017, *General Conditions of the Contract for Construction*

The provisions of this attachment shall delete, modify and supplement the provisions contained in the "*General Conditions of the Contract for Construction*," AIA Document A201-2017 Edition. The provisions contained in this attachment will supersede any conflicting provisions of the AIA Document. The term "Agency," as used in this Attachment, shall mean the United States of America, acting through the United States Department of Agriculture.

When the project is not subject to the Build America, Buy America Act the provisions in bold do not apply.

ARTICLE 1, GENERAL PROVISIONS

Add the following subparagraphs to paragraph 1.1:

1.1.9 <u>Build America, Buy America Act (BABAA)</u> – Requirements instituted by the Bipartisan Infrastructure Law of 2021 mandating domestic preference that all iron and steel, manufactured products, and construction materials are produced in the United States.

1.1.9.1 Construction Materials – Those articles, materials, or supply – other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives – that are or consist primarily of: non-ferrous metals, plastic and polymer-based products, glass, lumber or drywall.

1.1.9.2 Manufactured Product – Items assembled out of components, or otherwise made or processed from raw materials into finished products. Manufactured products must be manufactured (assembled) in the United States, and the cost of components that were mined, produced, or manufactured in the United States must be greater than 55 percent of the total cost of all components of the project.

1.1.9.3 Manufacturer's Certification – Documentation provided by a Manufacturer, certifying that the items provided by Manufacturer meet the domestic preference requirements of BABAA.

ARTICLE 2, OWNER

Delete subparagraph 2.3.6 and substitute the following:

2.3.6 The Owner shall furnish to the Contractor, free of charge,_____ copies of the Contract Documents necessary for execution of the Work. Additional copies will be available from the Architect at the cost of reproduction and handling.

ARTICLE 3: CONTRACTOR

Add the following subparagraph to paragraph 3.7:

3.7.3.1 The Contractor shall comply with the Federal Requirement for Domestic Preference: Iron and steel products, Manufactured Products, and Construction Materials used in this project shall comply with the Build America, Buy America Act (BABAA) requirements mandated by Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58. Installation of materials or products that are not compliant with BABAA requirements shall be considered defective work.

ARTICLE 4, ARCHITECT

Add the following to subparagraph 4.1.1: The term "Architect" means the Architect, or the Engineer when the nature of the work is within the authority granted engineers by the State licensure law, or an authorized representative of the Architect or Engineer.

ARTICLE 5, SUBCONTRACTORS

Add the following to the end of subparagraph 5.2.2: "The Contractor shall not contract with any person or entity declared ineligible under Federal laws or regulations from participating in federally assisted construction projects or to whom the Owner has made reasonable objection. The Contractor shall not be required to contract with anyone to whom the Contractor has reasonable objection".

ARTICLE 7, CHANGES IN THE WORK

Delete the words ", Construction Change Directive" from subparagraph 7.1.1.

Insert the words ", Agency " after the word "Owner," and delete the words "A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor" in subparagraph 7.1.2.

Delete the words "Construction Change Directive" from subparagraph 7.1.3.

Delete subparagraph 7.2.1, associated clauses, and substitute the following:

7.2.1 A Change Order is a written order to the Contractor utilizing AIA Document G701, 'Change Order', or Form RD 1924-7, 'Contract Change Order', signed by the Owner, Architect, Contractor, and the Agency representative. It is issued after the execution of the Contract, authorizing a change in the Work or an adjustment in the Contract Sum or the Contract Time. The Contract Sum and the Contract Time may be changed only by Change Order. The Contractor's signing of a Change Order indicates complete agreement therein.

Add subparagraph 7.2.2, and associated clauses as follows:

7.2.2 Methods used in determining adjustments to the Contract Sum may include any of the following:

.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluating.

.2 Unit prices stated in the Contract Documents or subsequently agreed upon.

Add the following sentence to the beginning of subparagraph 7.3.1: "A Construction Change Directive may be used only for a change in response to an emergency as described in paragraph 10.4".

Delete subparagraph 7.3.2 in its entirety.

Add the sentence "When the use of a Construction Change Directive is justified" where appropriate to subparagraphs 7.3.3, 7.3.6, 7.3.7, 7.3.9, and 7.3.10.

ARTICLE 8, TIME

Delete subparagraph 8.1.2 in its entirety and replace with the following:

8.1.2 The date of commencement shall be contained in the Notice to Proceed.

Add the following subparagraphs:

8.2.4 The Notice to Proceed shall be issued within twenty (20) calendar days of the execution of the Agreement by the Owner. Should there be reasons why the Notice to Proceed cannot be issued within such period, the time may be extended by mutual agreement of the Owner and Contractor, with the concurrence of the Agency. If the Notice to Proceed has not been issued within the twenty (20) calendar day period or within the period mutually agreed, the

Contractor may terminate the Agreement without further liability on the part of either party.

8.3.4 As outlined in the Agreement, the Contractor agrees to pay liquidated damages to the Owner for each calendar day of delay.

ARTICLE 9, PAYMENTS AND COMPLETION

Delete subparagraph 9.3.1.1 and substitute the following:

9.3.1.1 Work performed and materials supplied under a Change Order may be included for payment only after the Change Order has been approved by all appropriate parties and concurred with by the Agency.

Add the following sentence to the end of subparagraph 9.4.1: "All Certificates for Payment shall be prepared using AIA Document G702, 'Application and Certificate for Payment' or Form RD 1924-18, 'Partial Payment Estimate'.

Add the following subparagraph:

9.6.9 No progress payments will be made that deplete the retainage, nor place in escrow any funds that are required for retainage, nor invest the retainage for the benefit of the Contractor. Retainage will not be adjusted until after construction is substantially complete.

Replace the word "seven" with the words "fifteen (15)" in the first sentence of subparagraph 9.7.

Delete subparagraph 9.8.5, after the first sentence, and substitute the following: "When the Work has been substantially completed, except for Work which cannot be completed because of weather conditions, lack of materials or other reasons, which, in the judgment of the Owner, are valid reasons for non-completion, the Owner may make additional payments, retaining at all times an amount sufficient to cover the estimated cost of the Work still to be completed. The Owner shall provide a copy of the Certificate of Substantial Completion to the Agency".

Delete subparagraphs 9.9.1 in its entirety and replace with the following subparagraph and clauses:

9.9.1 The Contractor agrees to the use and occupancy of a portion or unit of the Project before formal acceptance by the Owner under the following conditions:

.1 A "Certificate of Substantial Completion" shall be prepared and executed as provided

in subparagraph 9.8.4, except that when, in the opinion of the Architect, the Contractor is chargeable with unwarranted delay in completing the Work or other Contract requirements, the signature of the Contractor will not be required. The Certificate of Substantial Completion shall be accompanied by a written endorsement of the Contractor's insurance carrier and surety permitting occupancy by the Owner during the remaining period of the Project Work. Occupancy and use by the Owner shall not commence until authorized by public authorities having jurisdiction over the Work.

.2 Occupancy by the Owner shall not be construed by the Contractor as being an acceptance of that part of the Project to be occupied.

.3 The Contractor shall not be held responsible for any damage to the occupied part of the Project resulting from the Owner's occupancy.

.4 Occupancy by the Owner shall not be deemed to constitute a waiver of existing claims in behalf of the Owner or Contractor against each other.

.5 If the Project consists of more than one building, and one of the buildings is to be occupied, the Owner, prior to occupancy of that building, shall secure permanent property insurance on the building to be occupied and necessary permits which may be required for use and occupancy.

Add the following sentence to the end of subparagraph 9.9.3: “Use and occupancy by the Owner prior to Project acceptance does not relieve the Contractor of responsibility to maintain all insurance and bonds required of the Contractor under the Contract Documents until the Project is completed and accepted by the Owner”.

ARTICLE 11, INSURANCE AND BONDS

Add the following subparagraphs and clauses:

11.1.1.1 Insurance shall be:

.1 Written with a limit of liability of not less than $500,000 for all damages arising out of bodily injury, including death, at any time resulting therefrom, sustained by any one person in any one accident; and a limit of liability of not less than $500,000 aggregate for any such damages sustained by two or more persons in any one accident. Insurance shall be written with a limit of liability of not less than $200,000 for all property damage sustained by any one person in any one accident; and a limit of liability of not less than $200,000 aggregate for any such damage sustained by two or more persons in any one accident, or

.2 Written with a combined bodily injury and damage liability of not less than $700,000 per occurrence; and with an aggregate of not less than $700,000 per occurrence.

.3 Insurance policies shall be written with limits of liability consistent with those insurance liability limits contained in the Contract Documents but not less than limits prescribed in 11.1.1.1.1 and 11.1.1.1.2.

Delete subparagraph 11.1.2 in its entirety and substitute the following subparagraphs:

11.1.2 The Contractor shall furnish the Owner bonds covering faithful performance of the Contract and payment of obligations arising thereunder within ten (10) calendar days after receipt of the Notice of Award. The surety company executing the bonds must hold a certificate of authority as an acceptable surety on Federal bonds as listed in Treasury Circular 570 and be authorized to transact business in the State where the Project is located. The bonds (using the forms included in the Bidding Documents) shall each be equal to the amount of the Contract. The United States, acting through Rural Development, will be named as co-obligee on all surety unless prohibited by State law. The cost of these bonds shall be included in the Contract Sum.

11.1.2.1 The Contractor shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current power of attorney.

11.1.2.2 If at any time a surety on any such bond is declared bankrupt or loses its right to do business in the State in which the work is to be performed or

is removed from the list of surety companies accepted on Federal Bonds, the Contractor shall within ten (10) calendar days after notice from the Owner to do so, substitute an acceptable bond in such form and sum and signed by such other surety or sureties as may be satisfactory to the Owner. The premiums of such bond shall be paid by any Contractor. No further payment shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable bond to the Owner.

ARTICLE 13, MISCELLANEOUS PROVISIONS

Add the following paragraphs, subparagraphs, and clauses:

13.6 This Agreement and any amendments to this Agreement shall not be in full force and effect until concurred with in writing by a duly authorized representative of the Agency. The concurrence so evidenced by the Agency shall in no way commit the Agency to render financial assistance to the Owner and is without liability to the Agency for any payment thereunder, but in the event such assistance is provided, the concurrence shall signify that the provisions of this Agreement and any amendments to this Agreement are consistent with Agency requirements.

13.7 Lands and Rights-of Way

13.7.1 Prior to the start of construction, the Owner shall obtain all lands and rights-of-way necessary for the execution and completion of work to be performed under this contract.

13.8 Equal Opportunity Requirements

Non-discrimination in Employment by Federally Assisted Construction Contractors, by Executive Order 11246.

13.8.1 This section summarizes Executive Order 11246, which prohibits employment discrimination and requires employers holding non-exempt Federal contracts and subcontracts and federally-assisted construction contracts and subcontracts in excess of $10,000 to take affirmative action to ensure equal employment opportunity without regard to race, color, religion, sex, or national origin. The Executive Order requires, as a condition for the approval of any federally assisted construction contract, that the applicant incorporate nondiscrimination and affirmative action clauses into its non-exempt federally assisted construction contracts.

13.8.2 Executive Order 11246, is administered and enforced by the Office of Federal Contract Compliance Programs (OFCCP), an agency in the U.S. Department of Labor's Employment Standards Administration. OFCCP has issued regulations at 41 CFR chapter 60 implementing the Executive Order. The regulations at 41 CFR part 60-4 establish the procedures which the Agency, as an administering agency, must follow when making grants, contracts, loans, insurance or guarantees involving federally assisted construction which is not exempt from the requirements of Executive Order 11246. The regulations which apply to Federal or federally assisted construction contractors also are published at 41 CFR part 60-4.

13.8.3 OFCCP has established numerical goals for minority and female utilization in construction work. The goals are expressed in percentage terms for the contractor's aggregate workforce in each trade. OFCCP has set goals for minority utilization based on the percentage of minorities in the civilian labor force in the relevant area. There is a single nationwide goal of 6.9 percent for utilization of women. The goals apply to all construction work in the covered geographic area, whether or not it is federal, federally assisted or non-federal. A notice advises bidders of the applicable goals for the area where the project is to be located.

13.8.4 The non-discrimination requirements of Executive Order 11246 shall apply to all construction contractor's or subcontractor's employees who are engaged in on-site construction including those construction employees who work on a non-Federal or non-Federally assisted construction site.

13.8.4.1 Agency officials will notify the appropriate Regional Director of OFCCP that an Agency financed construction contract has been awarded, and that the equal opportunity clauses are included in the contract documents.

13.8.4.2 The Regional Director, OFCCP-DOL, will enforce the non-discrimination requirements of Executive Order 11246.

13.8.5 The prospective contractor or subcontractor must comply with the Immigration Reform and Control Act of 1986, by completing and retaining Form I-9, "Employment Eligibility Verification," for employees hired. This form is available from the Immigration and Naturalization Service, and Department of Justice.

13.8.6 The prospective contractor or subcontractor must submit Form RD 400-6, "Compliance Statement," to the applicant and an Agency official as part of the bid package, prior to any contract bid negotiations and comply with the Executive Order 11246 as stated in the contract documents.

13.9 Statutes

13.9.1 The Contractor and each Subcontractor shall comply with the following statutes (and with regulations issued pursuant thereto, which are incorporated herein by reference):

13.9.1.1 Copeland Anti-Kickback Act (18 U.S.C. 874) as supplemented in Department of Labor regulations (29 CFR part 3). This Act provides that each Contractor shall be prohibited from inducing, by any means, any person in connection with construction to give up any part of the compensation to which the person is otherwise entitled.

13.9.1.2 Clean Air Act (42 U.S.C. 7414), section 114, and Water Pollution Control Act (33 U.S.C. 1813), section 308. Under Executive Order 11738 and Environmental Protection Agency (EPA) regulations 40 C.F.R. part 15, all Contracts in excess of $100,000 are required to comply with these Acts. The Acts require the Contractor to:

.1 Notify the Owner of the receipt of any communication from EPA indicating that a facility to be utilized in the performance of the Contract is under consideration to be listed on the EPA list of Violating Facilities.

.2 Certify that any facility to be utilized in the performance of any nonexempt Contractor or Subcontractor is not listed on the EPA list of Violating Facilities as of the date of the Contract Award.

.3 Include or cause to be included the above criteria and requirements of paragraphs .1

and .2 in every nonexempt subcontract, and that the Contractor will take such action as the Government may direct as a means of enforcing such provisions.

13.9.1.3 Restrictions on Lobbying (Public Law 101-121, section 319) as supplemented in Department of Agriculture regulations (2 CFR part 418). This statute applies to the recipients of contracts or subcontracts that exceed $100,000 at any tier under a Federal loan that exceeds $150,000 or a Federal grant that exceeds $100,000. If applicable, the Contractor must complete a certification form on lobbying activities related to the specific Federal loan or grant that is a funding source for this contract. The certification and disclosure forms shall be provided by the Owner.

13.10 Records

13.10.1 If the Contract is based on a negotiated Bid, the Owner, the Agency, the Comptroller General of the United States, or any of their duly authorized representatives, shall have access to any books, documents, papers, and records of the Contractor which are pertinent to a specific Federal loan program for the purpose of making audit, examination, excerpts, and transcriptions. The Contractor shall maintain records for at least three years after the Owner makes final payment and all other pending matters are closed.

13.11 Environmental Requirements

13.11.1 Mitigation Measures – The contractor shall comply with applicable mitigation measures established in the environmental assessment for the project. These may be obtained from the Agency representative.

13.11.2 The Contractor, when constructing a Project involving trenching, excavating, or other earth moving activity, shall comply with the following environmental constraints:

13.11.2.1 Endangered Species, Historic Preservation, Human Remains and Cultural Items, Hazardous Materials, and Paleontology – Any excavation or other earth moving activity by

the Contractor that provides evidence of the presence of endangered or threatened species or their critical habitat, uncovers a historical or archaeological artifact, human remains or cultural items, hazardous materials, a fossil or other paleontological materials will require the Contractor to:

.1 Temporarily stop work;

.2 Provide immediate notice to the Architect and the Agency, and in the case of potentially hazardous materials, provide immediate notice to local first responders and take such measures as necessary to protect the public and workers;

.3 Take reasonable measures as necessary to protect the discovered materials or protected resource;

.4 Abide by such direction as provided by the Agency, or Agencies responsible for resource protection or hazardous materials management; and

.5 Resume work only upon notice from the Architect and the Agency.

13.11.2.2 Historic Preservation - Applicants shall ensure that Contractors maintain a copy of the following inadvertent discovery plan onsite for review:

.1 If during the course of any ground disturbance related to any Project, any post review discovery, including but not limited to, any artifacts, foundations, or other indications of past human occupation of the area are uncovered, shall be protected by complying with 36 CFR § 800.13(b)(3) and (c) and shall include the following:

.2 All Work, including vehicular traffic, shall

immediately stop within a 50 ft. radius around the area of discovery. The Contractor shall ensure barriers are established to protect the area of discovery and notify the Architect or Engineer to contact the appropriate RD personnel. The Architect or Engineer shall engage a Secretary of the Interior (SOI) qualified professional archeologist to quickly assess the nature and scope of the discovery; implement interim measures to protect the discovery from looting and vandalism; and establish broader barriers if further historic and/or precontact properties, can reasonably be expected to occur.

.3 The RD personnel shall notify the appropriate RD environmental staff member, the Federal Preservation Officer (FPO), and State Historic Preservation Office (SHPO) immediately. Indian tribe(s) or Native Hawaiian Organization (NHOs) that have an interest in the area of discovery shall be contacted immediately. The SHPO may require additional tribes or NHOs who may have an interest in the area of discovery also be contacted. The notification shall include an assessment of the discovery provided by the SOI qualified professional archeologist.

.4 When the discovery contains burial sites or human remains, the Contractor shall immediately notify the appropriate RD personnel who will contact the RD environmental staff member, FPO, and the SHPO. The relevant law enforcement authorities shall be immediately contacted by onsite personnel to reduce delay times, in accordance with

tribal, state, or local laws including 36 CFR Part 800.13; 43 CFR Part 10, Subpart B; and the Advisory Council on Historic Preservation's Policy Statement Regarding treatment of Burial Sites, Human Remains, or Funerary Objects (February 23, 2007).

.5 When the discovery contains burial sites or human remains, all construction activities, including vehicular traffic shall stop within a 100 ft. radius of the discovery and barriers shall be established. The evaluation of human remains shall be conducted at the site of discovery by a SOI qualified professional. Remains that have been removed from their primary context and where that context may be in question may be retained in a secure location, pending further decisions on treatment and disposition. RD may expand this radius based on the SOI professional's assessment of the discovery and establish broader barriers if further subsurface burial sites, or human remains can reasonably be expected to occur. RD, in consultation with the SHPO and interested tribes or NHOs, shall develop a plan for the treatment of native human remains.

.6 Work may continue in other areas of the undertaking where no historic properties, burial sites, or human remains are present. If the inadvertent discovery appears to be a consequence of illegal activity such as looting, the onsite personnel shall contact the appropriate legal authorities immediately if the landowner has not already done so.

.7 Work may not resume in the area of the discovery until a notice to proceed has been issued by RD. RD shall not issue the notice to proceed until it has determined that the appropriate local protocols and consulting parties have been consulted.

.8 Inadvertent discoveries on federal and tribal land shall follow the processes required by the federal or tribal entity.

13.11.3 Lead-Based Paint - The Contractor and Owner shall comply with applicable Agency requirements of the Lead-Based Paint Poisoning Prevention Act, as amended (42 U.S.C. 4821), and the Residential Lead-Based Paint Hazard Reduction Act of 1992 (42 U.S.C. 4851) for rehabilitation work on residential property built prior to 1978.

13.12 Debarment and Suspension

13.12.1 The Contractor shall comply with the requirements of 2 CFR part 417, which pertains to the debarment or suspension of a person from participating in a Federal program or activity.

13.13 Build America, Buy America Act

Domestic Preference Requirements for Federal Financial Assistance to Non-Federal Entities. Federal Financial Assistance to Non-Federal Entities, defined pursuant to 2 CFR 200.1 as any State, local government, Indian tribe, Institution of Higher Education, or nonprofit organization, shall be governed by the requirements of Section 70914 of the Build America, Buy America Act (BABAA), under Title IX of the Infrastructure Investment and Jobs Act, Pub. L. 177-58. Any requests for waiver of these requirements must be submitted pursuant to USDA's guidance available online at USDA Buy America Waivers for Federal Financial Assistance | USDA.

13.13.1 This agreement is for services related to a project that is subject to the Build America, Buy America Act (BABAA) requirements under Title IX of the Infrastructure Investment and Jobs Act ("IIJA"), Pub. L. 177-58. Absent an approved waiver, all iron, steel, manufactured products, and construction materials used in this project must be produced in the United States, as further outlined by the Office

of Management and Budget's regulation (reference 2 CFR 200) on the application of Buy America Preference in Federal Financial Assistance Programs for Infrastructure.

13.13.2 The Contractor or Construction Manager shall be responsible for:

.1 Providing costs and revisions thereof that reflect compliance with BABAA requirements.

.2 Providing only iron, steel, construction materials and manufactured products that meet BABAA requirements. Installation of materials or products that are not compliant with BABAA requirements shall be considered defective work.

.3 Including manufacturer's certification for BABAA requirements with all applicable submittals. If a specific manufacturer is used in the bidding or subcontractor pricing, a statement that the manufacturer will comply with BABAA requirements must be included with the bid or GMP submission. Contractor or Construction Manager shall comply with BABAA requirements, including coordination with manufacturers, distributors, and suppliers to correct deficiencies in any BABAA documentation.

.4 Providing manufacturer's certification for BABAA requirements with any change order for any new construction materials or manufactured products required by the change.

.5 Certifying by submitting an application for payment, based in whole or in part on furnishing construction materials or manufactured products; that such materials and products, to the Contractor's or Construction Manager's knowledge, are compliant with BABAA requirements.

.6 Ensuring that the Architect / Engineer has been provided an approved manufacturer's certification or waiver prior to items being delivered to the project site.

.7 Certifying upon completion that all work and materials are in compliance with

BABAA requirements.

ARTICLE 15 CLAIMS AND DISPUTES

Add the words "may be" after "on the parties but" in the last sentence of subparagraph 15.2.5.

Replace the word "shall" with the word "may" in the first sentence, first occurrence of subparagraph 15.3.2.

Add the subparagraph: 15.4.1.2 The arbitrators will select a hearing location as close to the Owner's current place of business as possible.

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CERTIFICATION FOR CONTRACTS, GRANTS AND LOANS

The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant or Federal loan, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant or loan.

2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant or loan, the undersigned shall complete and submit Standard Form - LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including contracts, subcontracts, and subgrants under grants and loans) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

_____ _____

(name) (date)

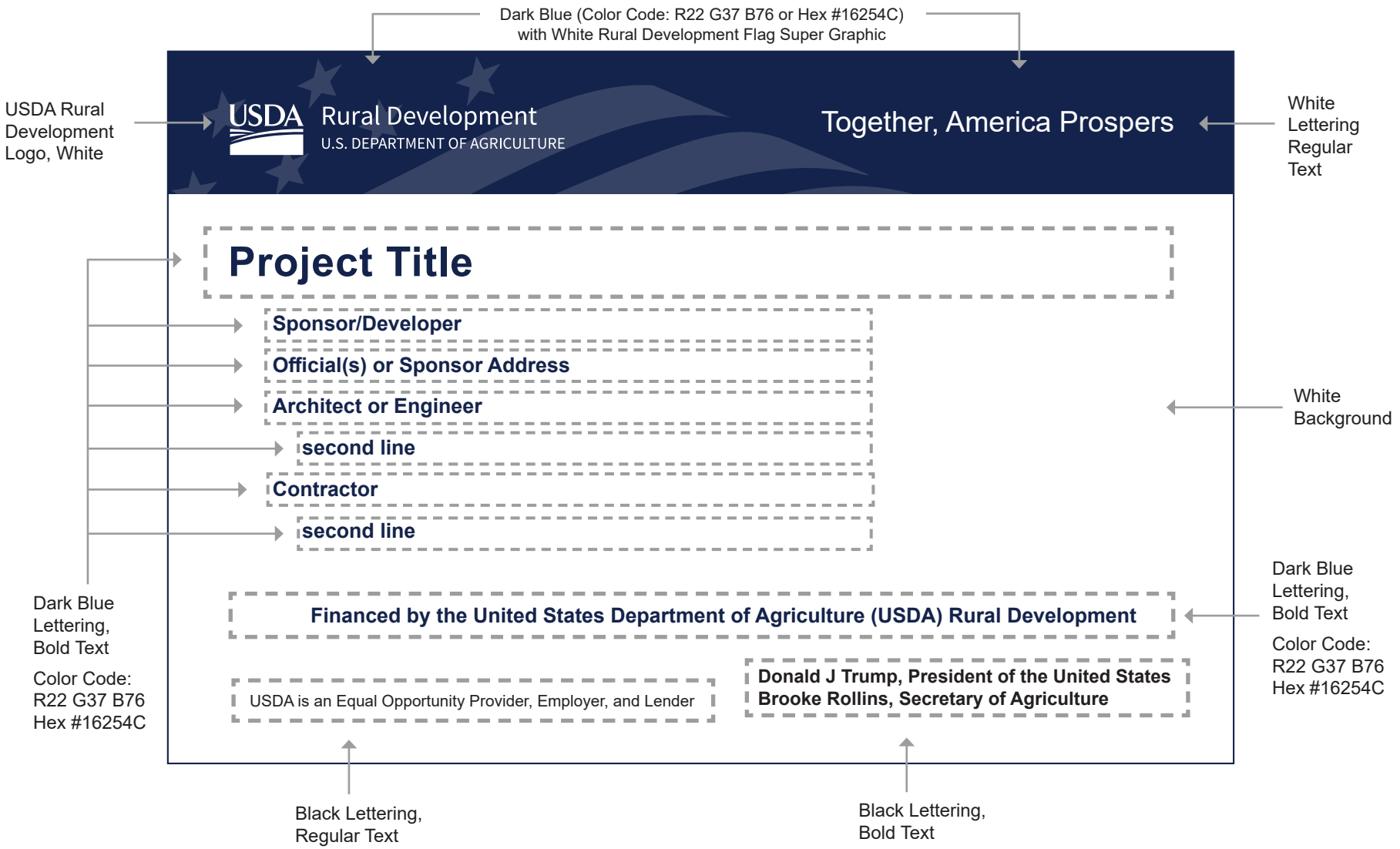
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Temporary Construction Sign for Rural Development Projects

Recommended Font: Arial



SIGN DIMENSIONS: 1200mm x 2400mm x 19mm (approx.4’ x 8’ x 3/4)
PLYWOOD PANEL (APA RATED A+B GRADE-EXTERIOR)

SECTION 01 1000

SUMMARY

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Summary of work narrative.
2. Use of premises.
3. Owner-furnished/Contractor-installed (OFCI) products.
4. Work restrictions.
5. Specification and Drawing conventions.
6. Miscellaneous provisions.

B. Related Requirements:

1. Section 01 5000 - Temporary Facilities and Controls: For limitations and procedures governing temporary use of Owner's facilities.

1.02 DEFINITIONS

A. Work Package: A group of specifications, drawings, and schedules prepared by the design team to describe a portion of the Project Work for pricing, permitting, and construction.

1.03 USE OF PREMISES

A. Limit site disturbance in order to limit compaction in the non-construction areas.

1.04 OWNER-FURNISHED/CONTRACTOR-INSTALLED (OFCI) PRODUCTS

A. Owner's Responsibilities: Owner will furnish products indicated and perform the following, as applicable:

1. Provide to Contractor Owner-reviewed Product Data, Shop Drawings, and Samples.
2. Provide for delivery of Owner-furnished products to Project site.
3. Upon delivery, inspect, with Contractor present, delivered items.
4. If Owner-furnished products are damaged, defective, or missing, arrange for replacement.
5. Obtain manufacturer's inspections, service, and warranties.
6. Inform Contractor of earliest available delivery date for Owner-furnished products.

B. Contractor's Responsibilities: The Work includes the following, as applicable:

1. Designate delivery dates of Owner-furnished products in Contractor's construction schedule, utilizing Owner-furnished earliest available delivery dates.

2. Review Owner-reviewed Product Data, Shop Drawings, and Samples, noting discrepancies and other issues in providing for Owner-furnished products in the Work.
3. Receive, unload, handle, store, protect, and install Owner-furnished products.
4. Make building services connections for Owner-furnished products.
5. Protect Owner-furnished products from damage during storage, handling, and installation and prior to Substantial Completion.
6. Repair or replace Owner-furnished products damaged following receipt.

C. Owner-Furnished/Contractor-Installed (OFCI) Products:
1. OFCI items, if any, are to be determined.

1.05 WORK RESTRICTIONS

A. Comply with restrictions on construction operations.
1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.

B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging for temporary utility services according to requirements indicated:
1. Notify Owner not less than two days in advance of proposed utility interruptions.
2. Obtain Owner's written permission before proceeding with utility interruptions.

C. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy with Owner.
1. Notify Owner not less than two days in advance of proposed disruptive operations.
2. Obtain Owner's written permission before proceeding with disruptive operations.

D. Smoking and Controlled Substance Restrictions: Use of tobacco products, alcoholic beverages, and other controlled substances on Project site is not permitted.

E. Fire protection:
1. Temporary covering of fire protection devices: Coverings placed on or over fire protection devices to protect them from damage during construction processes shall be immediately removed upon the completion of the construction processes in the room or area in which the devices are installed.
2. Fire watch: When required by the fire code official for building demolition, or building construction during working hours that is hazardous in nature, qualified personnel shall be provided to serve as an on-site fire watch. Fire watch personnel shall be provided with at least one approved means for notification of the fire department and their sole duty shall be to perform constant patrols and watch for the occurrence of fire.

1.06 SPECIFICATION AND DRAWING CONVENTIONS

A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

2. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.

3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.

4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.

B. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.

C. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.

D. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.

2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings.

3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 2100

ALLOWANCES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes administrative and procedural requirements governing allowances.

B. Types of allowances include the following:

1. Lump-sum allowances.
2. Unit-cost allowances.
3. Quantity allowances.
4. Contingency allowances.
5. Testing and inspecting allowances.

1.02 DEFINITIONS

A. Allowance: A quantity of work or dollar amount included in the Contract, established in lieu of additional requirements, used to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

1.03 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection, or purchase and delivery, of each product or system described by an allowance must be completed by the Owner to avoid delaying the Work.

B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by Architect from the designated supplier.

1.04 SUBMITTALS

A. Includes items indicated in specifications as Submittals, Action Submittals, Informational Submittals, and Closeout Submittals. Unless noted otherwise all submittals shall conform to the requirements of Action Submittals.

B. Submit proposals for purchase of products or systems included in allowances in the form specified for Change Orders.

C. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

D. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

E. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.05 LUMP-SUM ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.06 UNIT-COST ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.07 QUANTITY ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.08 CONTINGENCY ALLOWANCES

A. Use the contingency allowance only as directed by Architect for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.

B. Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.

C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit.

D. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.09 ADJUSTMENT OF ALLOWANCES

A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, required maintenance materials, and similar margins.

1. Include installation costs in purchase amount only where indicated as part of the allowance.

2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other markups.

3. Submit substantiation of a change in scope of Work, if any, claimed in Change Orders related to unit-cost allowances.

4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

B. Submit claims for increased costs due to a change in the scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.

1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of Work has changed from what could have been foreseen from information in the Contract Documents.

2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.02 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.03 SCHEDULE OF ALLOWANCES

A. Allowances, if any, are to be determined.

END OF SECTION

SECTION 01 2300

ALTERNATES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.02 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

1.03 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include, as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation, whether or not indicated as part of alternate.

B. Execute accepted alternates under the same conditions as other Work of the Contract.

C. Schedule: A Part 3 "Schedule of Alternates" Article is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 SCHEDULE OF ALTERNATES

A. Alternates, if any, are to be determined.

END OF SECTION

SECTION 01 2500

SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:

1. Section 01 2100 - Allowances: For products selected under an allowance.
2. Section 01 2300 - Alternates: For products selected under an alternate.
3. Section 01 6000 - Product Requirements: For requirements for submitting comparable product submittals for products by listed manufacturers.

1.02 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required to meet other Project requirements but may offer advantage to Contractor or Owner.

1.03 SUBMITTALS

A. Substitution Requests: Submit documentation identifying product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use form acceptable to Architect. Refer to Section 01 2503.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
    b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
    c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and

specific features and requirements indicated. Indicate deviations, if any, from the Work specified.

d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.

e. Samples, where applicable or requested.

f. Certificates and qualification data, where applicable or requested.

g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.

h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.

i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.

j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.

k. Cost information, including a proposal of change, if any, in the Contract Sum.

l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.

m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.

b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.04 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.05 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.06 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.

b. Substitution request is fully documented and properly submitted.

c. Requested substitution will not adversely affect Contractor's construction schedule.

d. Requested substitution has received necessary approvals of authorities having jurisdiction.

e. Requested substitution is compatible with other portions of the Work.

f. Requested substitution has been coordinated with other portions of the Work.

g. Requested substitution provides specified warranty.

h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 days after commencement of the Work. Requests received after that time may be considered or rejected at discretion of Architect.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.

b. Requested substitution does not require extensive revisions to the Contract Documents.

c. Requested substitution is consistent with the Contract Documents and will produce indicated results.

d. Substitution request is fully documented and properly submitted.

e. Requested substitution will not adversely affect Contractor's construction schedule.

f. Requested substitution has received necessary approvals of authorities having jurisdiction.

g. Requested substitution is compatible with other portions of the Work.

h. Requested substitution has been coordinated with other portions of the Work.

i. Requested substitution provides specified warranty.

j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

C. Design, material, and construction not approved as a substitution shall be considered as non-compliant with the Construction Documents. Installed work, not approved as a substitution, shall be the responsibility of the Contractor for removal. If removal is not possible for Life Safety considerations, Contractor shall refund to Owner the cost of the work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 2503

SUBSTITUTION REQUEST FORM

Project:_____ Substitution Request Number:_____

_____ From:_____

To:_____ Date:_____

_____ A/E Project Number:_____

Specification Section Title: _____

Specification Section #: _____ Page#:_____

Article or Paragraph #: _____

General Description of Product & Application: _____

Proposed Substitution: _____

Reason for Substitution: _____

Manufacturer Name:_____ Website: _____

Manufacturer Contact (for submitted product): _____ Contact Email: _____

☐ Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request. Applicable portions of the data are clearly identified. *Attach additional sheets to provide required substitution request information*.

☐ Attached data includes a description of Contract Documents changes that proposed substitution will require for its use and proper installation.

The Undersigned certifies:

☐ Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.

☐ Same warranty will be furnished for proposed substitution as for specified product.

☐ Same maintenance service and source of replacement parts, as applicable, is available.

☐ Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.

☐ Proposed substitution does not affect dimensions and functional clearances.

☐ Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

☐ **This substitution request form is complete and complies with all requirements of Section 01 2500 – Substitution Procedures. Provide additional requirements as an attachment to this form. Failure to comply with all requirements shall result in rejection of substitution request.**

Submitter Name:: _____(printed name)

Submitter Signature: _____(signature)

Company Name: _____ Telephone:_____

Address:: _____ Company Email:_____

A/E REVIEW AND ACTION

☐ Substitution Approved: Provide submittals in accordance with Specification Section 01 3300 - Submittal Procedures.

☐ Substitution Approved as Noted: Provide submittals in accordance with Specification Section 01 3300 - Submittal Procedures.

☐ Substitution Rejected: Information provided is incomplete and/or does not comply with Substitution requirements. Use specified materials.

☐ Substitution Rejected: Substitute not acceptable for use on project. Use specified materials.

☐ Substitution Request received too late - Use specified materials.

A/E Signature: _____

A/E Printed name: _____

Type of Supporting Data Attached: ☐ Drawings ☐ Details ☐ Product Data Sheets ☐ Material Samples ☐ Test Data ☐ Test Reports

END OF SECTION

SECTION 01 2900

PAYMENT PROCEDURES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Requirements:

1. Section 01 2100 - Allowances, for procedural requirements governing the handling and processing of allowances.
2. Section 01 3200 - Construction Progress Documentation, for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.03 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.04 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

B. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule. Cost-loaded Critical Path Method Schedule may serve to satisfy requirements for the schedule of values.

1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
2. Submit the schedule of values to Architect at earliest possible date, but no later than 7 days before the date scheduled for submittal of initial Applications for Payment.
3. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values coordinated with each phase of payment.

4. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values coordinated with each element.
5. Subschedules for Separate Design Contracts: Where the Owner has retained design professionals under separate contracts who will each provide certification of payment requests, provide subschedules showing values coordinated with the scope of each design services contract, as described in Section 01 1000 - Summary.

C. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
1. Identification: Include the following Project identification on the schedule of values:
    a. Project name and location.
    b. Owner's name.
    c. Owner's Project number.
    d. Name of Architect.
    e. Architect's Project number.
    f. Contractor's name and address.
    g. Date of submittal.
2. Arrange schedule of values consistent with format of AIA Document G703.
3. Arrange schedule of values consistent with format of EJCDC Document C-620
4. Arrange the schedule of values in tabular form, with separate columns to indicate the following for each item listed:
    a. Related Specification Section or division.
    b. Description of the Work.
    c. Name of subcontractor.
    d. Name of manufacturer or fabricator.
    e. Name of supplier.
    f. Change Orders (numbers) that affect value.
    g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent. Round dollar amounts to whole dollars, with total equal to Contract Sum.
        1) Labor.
        2) Materials.
        3) Equipment.
5. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.

6. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
    a. Differentiate between items stored on-site and items stored off-site.
7. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
8. Purchase Contracts: Provide a separate line item in the schedule of values for each Purchase contract. Show line-item value of Purchase contract. Indicate Owner payments or deposits, if any, and balance to be paid by Contractor.
9. Overhead Costs, Proportional Distribution: Include total cost and proportionate share of general overhead and profit for each line item.
10. Overhead Costs, Separate Line Items: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
11. Temporary Facilities: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
12. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
13. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.05 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments, as certified by Architect and paid for by Owner.

B. Each application for payment shall be accompanied by the following, all in form and substance satisfactory to the Architect:
    1. A current Contractor’s lien waiver and duly executed and acknowledged sworn statement showing all Subcontractors and material suppliers with whom the Contractor has entered into a subcontract, the amount requested for any Subcontract and material supplier in the requested progress payment, and the amount to be paid to the Contractor from such progress payment, together with similar sworn statements from all such Subcontractors and material suppliers.

C. Payment Application Times: The date for each progress payment is indicated in the Owner/Contractor Agreement. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

D. Payment Application Times: Submit Application for Payment to Architect by the date of the month selected by Architect. The period covered by each Application for Payment is one month, ending on the last day of the month or day designated by Architect.

1. Submit draft copy of Application for Payment seven days prior to due date for review by Architect.

E. Application for Payment Forms: The form of application for payment shall be a notarized AIA Document G702, Application and Certification for Payment, supported by AIA Document G703 with Continuation Sheets.

1. Other Application for Payment forms proposed by the Contractor may be acceptable to Architect and Owner. Submit forms for approval with initial submittal of schedule of values.

F. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.

G. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.

1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
3. Provide summary documentation for stored materials indicating the following:
    a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
    b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
    c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

H. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

I. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment including, but not limited to subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.

2. When an application shows completion of an item, submit conditional final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.

J. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).
4. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
5. Products list (preliminary if not final).
6. Sustainable design action plans, including preliminary project materials cost data.
7. Schedule of unit prices.
8. Submittal schedule (preliminary if not final).
9. List of Contractor's staff assignments.
10. List of Contractor's principal consultants.
11. Copies of building permits.
12. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
13. Initial progress report.
14. Report of preconstruction conference.
15. Certificates of insurance and insurance policies.
16. Performance and payment bonds.
17. Data needed to acquire Owner's insurance.

K. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
a. Complete administrative actions, submittals, and Work preceding this application, as described in Section 01 7700 - Closeout Procedures.

2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

L. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Certification of completion of final punch list items.
3. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
4. Updated final statement, accounting for final changes to the Contract Sum.
5. AIA Document G706.
6. AIA Document G706A.
7. AIA Document G707.
8. Evidence that claims have been settled.
9. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
10. Final liquidated damages settlement statement.
11. Proof that taxes, fees, and similar obligations are paid.
12. Waivers and releases.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

SECTION 01 3100

PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.01 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project, including, but not limited to, the following:

1. General coordination procedures.
2. Coordination drawings.
3. RFIs.
4. Digital project management procedures.
5. Web-based Project management.
6. Project meetings.
7. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
8. Related Requirements:
    a. Section 01 3200 - Construction Progress Documentation: For preparing and submitting Contractor's construction schedule.
    b. Section 01 7300 - Execution: For procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
    c. Section 01 7700 - Closeout Procedures: For coordinating closeout of the Contract.

B. The Contractor hereby specifically acknowledges that the Contract Documents are sufficiently full and complete to have enabled it to determine the cost of all work; that the drawings, the specifications and all addenda are sufficient to enable the Contractor to construct the work outlined therein in accordance with applicable laws, statutes, building codes and regulations, and otherwise to fulfill all of its obligations under the Contract Documents. In addition, the Contractor acknowledges that if it reasonably should have known, that the Contract Documents contains an error, inconsistency or omission, the Contractor shall be responsible for such performance and shall bear the cost for correction of the work thereof.

C. Upon receiving Building Permit, Contractor shall provide a PDF of scanned Building Permit Documents to Architect.

D. Where Contract Documents require that work be inspected tested or approved, and when Contractor determines that the work is Substantially Complete, the Contractor shall give timely notice, including written notice where required. However, should work requiring testing, inspection or approval not be in readiness, Contractor or the sub-contractor

responsible shall pay professional fees, travel and living expenses, as applicable, for persons inconvenienced by false notice.

E. Addenda: The contractor shall be responsible for filing Addenda and modifications to the Contract Documents with public authorities having jurisdiction over the Work after the permit has been received. Such documents shall include periodic drawings revisions as may be required by such authorities.

F. Changes to the Contract: When revised documents are issued which reflect either extra cost or credit to the Owner, the Contractor shall submit to the Architect within thirty days a cost breakdown covering each change. Each cost breakdown shall include unit costs of material and labor with extensions listing quantities and total costs. If no proposal is made by the Contractor within thirty days of issuance of documents marked as Issued for Construction for a change, which constitutes an increase in the Contract Sum, all revised documents shall become Contract Documents with no change in the Contract Sum. This thirty day period shall apply to extra costs only, not to credits to the Contract Sum.

G. Application for Payment: Refer to Section 01 2900 - Payment Procedures.

1.02 DEFINITIONS

A. BIM: Building Information Modeling.

B. RFI: Request for Information. Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.03 SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses, cellular telephone numbers, and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1. Submit Key Personnel for each project Contract/Subcontract.
2. Post copies of list in Project meeting room(s), in temporary field office(s), in prominent location in each built facility. Keep list current at all times.

1.04 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results, where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.
4. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
    a. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
5. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
    a. Preparation of Contractor's construction schedule.
    b. Preparation of the schedule of values.
    c. Installation and removal of temporary facilities and controls.
    d. Delivery and processing of submittals.
    e. Progress meetings.
    f. Preinstallation conferences.
    g. Project closeout activities.
    h. Startup and adjustment of systems.

1.05 REQUEST FOR INFORMATION (RFI)

A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
2. Coordinate and submit RFIs in a prompt manner to avoid delays in Contractor's work or work of subcontractors.

3. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
    a. Project name.
    b. Owner name.
    c. Owner's Project number.
    d. Name of Architect.
    e. Architect's Project number.
    f. Date.
    g. Name of Contractor.
    h. RFI number, numbered sequentially.
    i. RFI subject.
    j. Specification Section number and title and related paragraphs, as appropriate.
    k. Drawing number and detail references, as appropriate.
    l. Field dimensions and conditions, as appropriate.
    m. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
    n. Contractor's signature.
    o. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
        1) Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

B. RFI Forms: AIA Document G716.
    1. Attachments shall be electronic files in PDF format.

C. Architect's Action:
    1. The Architect will review Requests for Information to determine whether they are Requests for Information as defined herein.
        a. If the Architect determines that the document is not a Request for Information, it will be returned to the Contractor unreviewed and will be marked as a “non-compliant RFI” with the procedures set forth in the contract documents.
        b. If the Architect determines that the documents are a Request for Information, but that the information contained in the request is incomplete it will return the Request for Information back with notification about the needed information in order to complete its response. Once returned there will be no consideration for delay to the project due to the requested additional information.
        c. If the Architect determines that the documents are a Request for Information, it will proceed with providing an answer in a timely fashion. The Architect shall NOT be required to respond to any RFI’s within a certain calendar timeframe. This

condition shall supersede any agreed condition of the General Conditions of the Contract between the Owner and Contractor. By accepting the specifications the Contractor agrees to this condition.

2. The Contractor has been involved with the bidding and preconstruction of the project and by accepting the contract documents and executing an agreement with the Owner agrees that the Contract Documents are complete and coordinated to build the project for its intended purpose. When an executed Guaranteed Maximum Price contract has been executed between the Owner and Contractor NO consideration will be given for change order pricing for Requests for Information.
3. Requests for Information, as defined herein, are intended to guide the Contractor on information regarding the project. By accepting the contract, the contractor is indicating the Contract Documents are complete to build the project. It is the intent to not limit the amount of Requests for Information from the contractor. As the Owner has contracted with the Architect's office to administer the contract it is the Architect's opinion, that a project of this size, should not require more than 150 Requests for Information. Should the total number of Requests for Information exceed 150 the Architects office reserves the right, but not the absolute requirement, to request payment from the General Contractor from its Overhead and Profit schedule of value to compensate the Owner for payment to the Architect's office for the additional administration costs to respond to the Request for Information.
4. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.

D. The following Contractor-generated RFIs will be returned without action:
1. Requests for approval of submittals.
2. Requests for approval of substitutions.
3. Requests for approval of Contractor's means and methods.
4. Requests for coordination information already indicated in the Contract Documents.
5. Requests for adjustments in the Contract Time or the Contract Sum.
6. Requests for interpretation of Architect's actions on submittals.

E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly
1. Include the following:
a. Project name.
b. Name and address of Contractor.
c. Name and address of Architect.
d. RFI number, including RFIs that were returned without action or withdrawn. Subsequent RFI's based on same topic as the original RFI shall be submitted with the same RFI number followed by a decimal point and additional numbering (i.e. RFI-043, RFI-043.1, RFI-043.2, RFI-043.3).
e. RFI description.

f. Date the RFI was submitted.

g. Date Architect's response was received.

h. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

i. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

2. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

1.06 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.

1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Information (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punchlist, and any other document any participant wishes to make part of the project record.

2. Contractor and Architect are required to use this service.

3. It is Contractor's responsibility to submit documents in allowable format.

4. Architect's consultants will be permitted to use the service at no extra charge.

5. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.

6. Paper document transmittals will not be reviewed.

7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.

B. Submittal Service: The required service is.

1. Newforma - Hosted on Architect's server.

a. This service is available at no charge for the Contractor to transmit Submittals and RFIs and is solely intended for Architect’s receipt and distribution purposes only. No documents will be stored for team retrieval on this site.

C. Project Closeout: Architect will determine when to terminate the service for the project.

D. Project Closeout: Contractor is responsible for obtaining archive copies of files for Owner and Architect.

1.07 DIGITAL FILE PROCEDURES

A. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:

1. Assemble complete submittal package into a single indexed file, incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.
3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

B. BIM File Incorporation: Contractor based BIM is not required. Architect's BIM model is not available for use by subcontractors.

C. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.

1. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
2. General Contractor/Construction Manager will be furnished with an initial set of AutoCAD format backgrounds for use by subcontractors. All subcontractors requesting copies shall submit completed release to Architect for record.
3. Digital Data Software Program: Drawings are available in digital data software program and operating system selected by Architect.
4. Architect digital data file release form shall be as provided by Architect for Contractor use.

1.08 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of unscheduled meeting dates and times a minimum of 10 working days prior to meeting.
   a. Owner/Architect/Contractor meetings shall be regularly scheduled prior to start of Work on schedule agreed to by Owner and Architect.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, Construction Manager, and Architect, within three days of the meeting.

B. Preconstruction Conference: Architect will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.

1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:
    a. Responsibilities and personnel assignments.
    b. Tentative construction schedule.
    c. Phasing.
    d. Critical work sequencing and long lead items.
    e. Designation of key personnel and their duties.
    f. Lines of communications.
    g. Use of web-based Project software.
    h. Procedures for processing field decisions and Change Orders.
    i. Procedures for RFIs.
    j. Procedures for testing and inspecting.
    k. Procedures for processing Applications for Payment.
    l. Distribution of the Contract Documents.
    m. Submittal procedures.
    n. Sustainable design requirements.
    o. Preparation of Record Documents.
    p. Use of the premises.
    q. Work restrictions.
    r. Working hours.
    s. Owner's occupancy requirements.
    t. Responsibility for temporary facilities and controls.
    u. Procedures for moisture and mold control.
    v. Procedures for disruptions and shutdowns.
    w. Construction waste management and recycling.
    x. Parking availability.
    y. Office, work, and storage areas.
    z. Equipment deliveries and priorities.
    aa. First aid.
    ab. Security.

ac. Progress cleaning.

3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other Sections and when required for coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect, of scheduled meeting dates.

2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

a. Contract Documents.

b. Options.

c. Related RFIs.

d. Related Change Orders.

e. Purchases.

f. Deliveries.

g. Submittals.

h. Sustainable design requirements.

i. Review of mockups.

j. Possible conflicts.

k. Compatibility requirements.

l. Time schedules.

m. Weather limitations.

n. Manufacturer's written instructions.

o. Warranty requirements.

p. Compatibility of materials.

q. Acceptability of substrates.

r. Temporary facilities and controls.

s. Space and access limitations.

t. Regulations of authorities having jurisdiction.

u. Testing and inspecting requirements.

v. Installation procedures.

w. Coordination with other work.

x. Required performance results.

y. Protection of adjacent work.

z. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.

4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.

5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 90 days prior to the scheduled date of Substantial Completion.

1. Conduct the conference to review requirements and responsibilities related to Project closeout.

2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:

a. Preparation of Record Documents.

b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.

c. Procedures for completing and archiving web-based Project software site data files.

d. Submittal of written warranties.

e. Requirements for completing sustainable design documentation.

f. Requirements for preparing operations and maintenance data.

g. Requirements for delivery of material samples, attic stock, and spare parts.

h. Requirements for demonstration and training.

i. Preparation of Contractor's punch list.

j. Procedures for processing Applications for Payment at Substantial Completion and for final payment.

k. Submittal procedures.

l. Coordination of separate contracts.

m. Owner's partial occupancy requirements.

n. Installation of Owner's furniture, fixtures, and equipment.

o. Responsibility for removing temporary facilities and controls.

4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

E. Progress Meetings: Conduct progress meetings at biweekly intervals.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
    a. Architect will attend progress meetings in person at end of each calendar month for pay requisition review. Other progress meetings shall be attended by Architect using Microsoft Teams or phone teleconference call.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
4. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
    a. Review schedule for next period.
    b. Review present and future needs of each entity present, including the following:
        1) Interface requirements.
        2) Sequence of operations.
        3) Resolution of BIM component conflicts.
        4) Status of submittals.
        5) Status of sustainable design documentation.
        6) Deliveries.
        7) Off-site fabrication.
        8) Access.
        9) Site use.
        10) Temporary facilities and controls.
        11) Progress cleaning.
        12) Quality and work standards.
        13) Status of correction of deficient items.
        14) Field observations.

15) Status of RFIs.

16) Status of Proposal Requests.

17) Pending changes.

18) Status of Change Orders.

19) Pending claims and disputes.

20) Documentation of information for payment requests.

5. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

   a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting, where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

F. Coordination Meetings: Conduct Project coordination meetings at weekly intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

1. Attendees: Each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.

2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

   a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

   b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting, where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.

   c. Review present and future needs of each contractor present, including the following:

      1) Interface requirements.

      2) Sequence of operations.

      3) Status of submittals.

      4) Deliveries.

5) Off-site fabrication.

6) Access.

7) Site use.

8) Temporary facilities and controls.

9) Work hours.

10) Hazards and risks.

11) Progress cleaning.

12) Quality and work standards.

13) Status of RFIs.

14) Proposal Requests.

15) Change Orders.

16) Pending changes.

3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART 2 PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 3200

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 GENERAL

1.01 SUMMARY

A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Startup construction schedule.
2. Contractor's Construction Schedule.
3. Construction schedule updating reports.
4. Daily construction reports.
5. Material location reports.
6. Site condition reports.
7. Unusual event reports.

B. Related Requirements:

1. Section 01 4000 - Quality Requirements: For schedule of tests and inspections.
2. Section 01 2900 - Payment Procedures: For schedule of values and requirements for use of cost-loaded schedule for Applications for Payment.

1.02 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Cost Loading: The allocation of the schedule of values for completing an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum.

C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine the critical path of Project and when activities can be performed.

D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

E. Event: The starting or ending point of an activity.

F. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

G. Resource Loading: The allocation of manpower and equipment necessary for completing an activity as scheduled.

1.03 SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:

1. Working electronic copy of schedule file.
2. PDF file.

B. Startup construction schedule.

1. Submittal of cost-loaded startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.

C. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.

D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.

E. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

1. Activity Report: List of activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of preceding and succeeding activities for each activity, sorted in ascending order by activity number and then by early start date, or actual start date if known.
3. Total Float Report: List of activities sorted in ascending order of total float.
4. Earnings Report: Compilation of Contractor's total earnings from commencement of the Work until most recent Application for Payment.

F. Construction Schedule Updating Reports: Submit with Applications for Payment.

G. Daily Construction Reports: Submit at monthly intervals.

H. Material Location Reports: Submit at monthly intervals.

I. Site Condition Reports: Submit at time of discovery of differing conditions.

J. Unusual Event Reports: Submit at time of unusual event.

K. Qualification Data: For scheduling consultant.

1.04 QUALITY ASSURANCE

A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Architect's request.

B. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 01 3100 - Project Management and Coordination. Review methods and procedures related to the preliminary construction schedule and Contractor's Construction Schedule, including, but not limited to, the following:

1. Verify availability of qualified personnel needed to develop and update schedule.
2. Discuss constraints, including phasing, work stages, area separations, interim milestones, and, partial Owner occupancy.
3. Review delivery dates for Owner-furnished products.
4. Review schedule for work of Owner's separate contracts.
5. Review submittal requirements and procedures.
6. Review time required for review of submittals and resubmittals.
7. Review requirements for tests and inspections by independent testing and inspecting agencies.
8. Review time required for Project closeout and Owner startup procedures..
9. Review and finalize list of construction activities to be included in schedule.
10. Review procedures for updating schedule.

1.05 COORDINATION

A. Coordinate Contractor's Construction Schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities, and schedule them in proper sequence.

1.06 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

1. Use scheduling software package for current Windows operating system.

B. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting, using CPM scheduling.

1. In-House Option: Owner may waive requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.
2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.

C. Time Frame: Extend schedule from date established for commencement of the Work to date of Final Completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

D. Activities: Treat each floor or separate area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
2. Temporary Facilities: Indicate start and completion dates for the following as applicable:
    a. Securing of approvals and permits required for performance of the Work.
    b. Temporary facilities.
    c. Construction of mock-ups, prototypes and samples.
    d. Owner interfaces and furnishing of items.
    e. Interfaces with Separate Contracts.
    f. Regulatory agency approvals.
    g. Punch list.
3. Procurement Activities: Include procurement process activities for long lead-time items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
4. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
5. Startup and Testing Time: Include no fewer than 15 days for startup and testing.

6. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
7. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and Final Completion.

E. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Phasing: Arrange list of activities on schedule by phase.
2. Work under More Than One Contract: Include a separate activity for each contract.
3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Section 01 1000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
5. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 01 1000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
6. Work Restrictions: Show the effect of the following items on the schedule:
   a. Coordination with existing construction.
   b. Limitations of continued occupancies.
   c. Uninterruptible services.
   d. Partial occupancy before Substantial Completion.
   e. Use-of-premises restrictions.
   f. Provisions for future construction.
   g. Seasonal variations.
   h. Environmental control.
7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
   a. Subcontract awards.
   b. Submittals.
   c. Purchases.
   d. Mockups.
   e. Fabrication.
   f. Sample testing.
   g. Deliveries.
   h. Installation.
   i. Tests and inspections.

j. Adjusting.

k. Curing.

l. Building flush-out.

m. Startup and placement into final use and operation.

n. Commissioning.

8. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:

a. Structural completion.

b. Temporary enclosure and space conditioning.

c. Permanent space enclosure.

d. Completion of mechanical installation.

e. Completion of electrical installation.

f. Substantial Completion.

F. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, Final Completion and temporary enclosure, space conditioning slab completion an building topping out.

G. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.

H. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

1. Unresolved issues.

2. Unanswered Requests for Information.

3. Rejected or unreturned submittals.

4. Notations on returned submittals.

5. Pending modifications affecting the Work and the Contract Time.

I. Contractor's Construction Schedule Updating: At two month intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before next regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.

2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.

3. As the Work progresses, indicate Final Completion percentage for each activity.

J. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.

K. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

1.07 STARTUP CONSTRUCTION SCHEDULE

A. Gantt-Chart Schedule: Submit startup, horizontal, Gantt-chart-type construction schedule within seven days of date established for commencement of the Work.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

1.08 CPM SCHEDULE REQUIREMENTS

A. Prepare network diagrams using AON (activity-on-node) format.

B. Startup Network Diagram: Submit diagram within 14 days of date established for commencement of the Work. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

C. CPM Schedule: Prepare Contractor's Construction Schedule using a cost- and resource-loaded, time-scaled CPM network analysis diagram for the Work.

1. Develop network diagram in sufficient time to submit CPM schedule, so it can be accepted for use no later than 60 days after date established for commencement of the Work.
    a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates.
2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.

3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule to coordinate with the Contract Time.

D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.

1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
    a. Preparation and processing of submittals.
    b. Mobilization and demobilization.
    c. Purchase of materials.
    d. Delivery.
    e. Fabrication.
    f. Utility interruptions.
    g. Installation.
    h. Work by Owner that may affect or be affected by Contractor's activities.
    i. Testing and inspection.
    j. Commissioning.
    k. Punch list and Final Completion.
    l. Activities occurring following Final Completion.
2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
    a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
5. Cost- and Resource-Loading of CPM Schedule: Assign cost to construction activities on the CPM schedule. Do not assign costs to submittal activities. Obtain Architect's approval prior to assigning costs to fabrication and delivery activities. Assign costs under main subcontracts for testing and commissioning activities, operation and maintenance manuals, punch list activities, Project record documents, and demonstration and training (if applicable), in the amount of 5 percent of the Contract Sum.
    a. Each activity cost shall reflect an appropriate value subject to approval by Architect.

b. Total cost assigned to activities shall equal the total Contract Sum.

E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall Project schedule.

F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:

1. Contractor or subcontractor and the Work or activity.
2. Description of activity.
3. Main events of activity.
4. Immediate preceding and succeeding activities.
5. Early and late start dates.
6. Early and late finish dates.
7. Activity duration in workdays.
8. Total float or slack time.
9. Average size of workforce.
10. Dollar value of activity (coordinated with the schedule of values).

G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

1. Identification of activities that have changed.
2. Changes in early and late start dates.
3. Changes in early and late finish dates.
4. Changes in activity durations in workdays.
5. Changes in the critical path.
6. Changes in total float or slack time.
7. Changes in the Contract Time.

H. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.

1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.
    a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.

b. Submit value summary printouts one week before each regularly scheduled progress meeting.

1.09 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain or snow.
7. Testing and inspection.
8. Accidents.
9. Meetings and significant decisions.
10. Unusual events.
11. Stoppages, delays, shortages, and losses.
12. Meter readings and similar recordings.
13. Emergency procedures.
14. Orders and requests of authorities having jurisdiction.
15. Change Orders received and implemented.
16. Construction Change Directives received and implemented.
17. Services connected and disconnected.
18. Equipment or system tests and startups.
19. Partial completions and occupancies.
20. Substantial Completions authorized.

B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:

1. Material stored prior to previous report and remaining in storage.
2. Material stored prior to previous report and since removed from storage and installed.
3. Material stored following previous report and remaining in storage.

C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for

Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

D. Unusual Event Reports: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, responses by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

1. Submit unusual event reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 3233

PHOTOGRAPHIC DOCUMENTATION

PART 1 GENERAL

1.01 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Preconstruction photographs.
2. Concealed Work photographs.
3. Periodic construction photographs.
4. Final Completion construction photographs.

B. Related Requirements:

1. Section 01 7700 - Closeout Procedures: For submitting photographic documentation as Project Record Documents at Project closeout.
2. Section 01 7900 - Demonstration and Training: For submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.02 INFORMATIONAL SUBMITTALS

A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph and video recording. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.

B. Digital Photographs: Submit image files within three days of taking photographs.

1. Submit photos by email or other electronic transmission method acceptable to Architect.
    a. Compile into Adobe Acrobat PDF (current version compatible).
    b. Include copy of key plan indicating each photograph's location and direction.
2. Identification: Provide the following information with each image description in file metadata tag:
    a. Name of Project.
    b. Name and contact information for photographer.
    c. Name of Architect.
    d. Name of Contractor and related material Installer(s).
    e. Date photograph was taken.
    f. Description of location, vantage point, and direction.
    g. Unique sequential identifier keyed to accompanying key plan.

C. Construction Photographs: Submit photographs in accordance with the requirements of this section at the following minimum intervals:

1. Preconstruction photographs.
2. Periodic construction photographs.
    a. Weekly.
    b. Monthly.
3. Final completion construction photographs.
4. Any additional photographs requested by Architect or Owner.

1.03 CONSTRUCTION PHOTOGRAPHS, FORMATS AND MEDIA

A. Digital Photographs: Provide color images in JPG format, produced by a digital camera with minimum sensor size of 12 megapixels, and at an image resolution of not less than 3200 by 2400 pixels, and with vibration-reduction technology. Use flash and supplemental lighting in low light levels or backlit conditions.
    1. Use of smart phones for photography is acceptable subject to compliance with requirements indicated.

B. Digital Images: Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

C. Metadata: Record accurate date and time and GPS location data from camera.

D. File Names: Name media files with date, Project area and sequential numbering suffix.

1.04 CONSTRUCTION PHOTOGRAPHS

A. Photographer: Engage a qualified photographer to take construction photographs.
    1. Photographer Qualifications: An individual who has been regularly engaged as a professional photographer of construction projects for not less than three years.
        a. Contractor personnel experienced in general use construction photography may be acceptable for some photographic requirements where approved by Architect.

B. General: Take photographs with maximum depth of field and in focus.
    1. Maintain key plan with each set of construction photographs that identifies each photographic location.

C. Preconstruction Photographs: Before commencement of the Work, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.
    1. Flag excavation areas and construction limits before taking construction photographs.
    2. Take minimum 20 photographs to show existing conditions adjacent to property before starting the Work.
    3. Take minimum 20 photographs of existing buildings either on or adjoining property, to accurately record physical conditions at start of construction.

4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.

D. Concealed Work Photographs: Before proceeding with installing work that will conceal other work, take photographs sufficient in number, with annotated descriptions, to record nature and location of concealed Work, including, but not limited to, the following:

1. Underground utilities.
2. Underslab services.
3. Piping.
4. Electrical conduit.

E. Weekly Periodic Construction Photographs: Take minimum 20 photographs weekly to provide example of overall project progress; provide additional photos as needed to illustrate progress. Send by email to project team members selected by Architect.

F. Monthly Periodic Construction Photographs: Take minimum 20 photographs monthly coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.

G. Final Completion Construction Photographs: Take minimum 20 photographs after date of Substantial Completion for submission as Project Record Documents. Architect will inform photographer of desired vantage points.

H. Additional Photographs: Architect may request photographs in addition to periodic photographs specified. Additional photographs will be paid for by Change Order and are not included in the Contract Sum .

1. Three days' notice will be given, where feasible.
2. In emergency situations, take additional photographs within 24 hours of request.
3. Circumstances that could require additional photographs include, but are not limited to, the following:
    a. Special events planned at Project site.
    b. Immediate follow-up when on-site events result in construction damage or losses.
    c. Photographs shall be taken at fabrication locations away from Project site. These photographs are not subject to unit prices or unit-cost allowances.
    d. Substantial Completion of a major phase or component of the Work.
    e. Extra record photographs at time of final acceptance.
    f. Owner's request for special publicity photographs.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 3300

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Submittal schedule requirements.
2. Administrative and procedural requirements for submittals.

B. Related Requirements:

1. Section 01 3200 - Construction Progress Documentation: For submitting schedules and reports, including Contractor's construction schedule.
2. Section 01 3233 - Photographic Documentation: For submitting preconstruction photographs, periodic construction photographs, and Final Completion construction photographs.
3. Section 01 7700 - Closeout Procedures: For submitting closeout submittals and maintenance material submittals.
4. Section 01 7823 - Operation and Maintenance Data: For submitting operation and maintenance manuals.
5. Section 01 7839 - Project Record Documents: For submitting record Drawings, record Specifications, and record Product Data.
6. Section 01 7900 - Demonstration and Training: For submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.02 DEFINITIONS

A. Submittals: Includes items indicated in specifications as Submittals, Action Submittals, Informational Submittals, and Closeout Submittals. Unless noted otherwise all submittals shall conform to the requirements of Action Submittals.

B. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

C. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.03 SUBMITTAL SCHEDULE

A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for

review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal Schedule: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal Schedule: Submit concurrently with the first complete submittal of Contractor's construction schedule.
    a. Submit revised submittal schedule as required to reflect changes in current status and timing for submittals.
4. Format: Arrange the following information in a tabular format:
    a. Scheduled date for first submittal.
    b. Specification Section number and title.
    c. Submittal Category: Action; informational.
    d. Name of subcontractor.
    e. Description of the Work covered.
    f. Scheduled date for Architect's final release or approval.
    g. Scheduled dates for purchasing.
    h. Scheduled date of fabrication.
    i. Scheduled dates for installation.
    j. Activity or event number.

1.04 SUBMITTAL FORMATS

A. Submittal Information: Include the following information in each submittal:
    1. Project name.
    2. Date.
    3. Name of Architect.
    4. Name of Construction Manager.
    5. Name of Contractor.
    6. Name of firm or entity that prepared submittal.
    7. Names of subcontractor, manufacturer, and supplier.
    8. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier and alphanumeric suffix for resubmittals.
    9. Category and type of submittal.

10. Submittal purpose and description.
11. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
12. Drawing number and detail references, as appropriate.
13. Indication of full or partial submittal.
14. Location(s) where product is to be installed, as appropriate.
15. Other necessary identification.
16. Remarks.
17. Signature of transmitter.

B. Options: Identify options requiring selection by Architect.

C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

D. Electronic Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

1.05 SUBMITTAL PROCEDURES

A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Submit in accordance with Architect's Electronic Document Submittal Service requirements.
2. Submittal Numbering: Number sequentially. Subsequent Submittal's based on same product as the original Submittal shall be submitted with the same Submittal number followed by a decimal point and additional numbering (i.e. 07 6200.01, 07 6200.2, 07 6200.3, 07 6200.3).

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections, so processing will not be delayed because of need to review submittals concurrently for coordination.

a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 15 days for review of each resubmittal.
4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
    a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
6. Contractor may negotiate a different review time than those stated above upon submittal of Submittal Schedule.

D. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block, and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Architect' action stamp.

E. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

1.06 SUBMITTAL REQUIREMENTS

A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.

2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:
    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.
    f. Application of testing agency labels and seals.
    g. Notation of coordination requirements.
    h. Availability and delivery time information.
4. For equipment, include the following in addition to the above, as applicable:
    a. Wiring diagrams that show factory-installed wiring.
    b. Printed performance curves.
    c. Operational range diagrams.
    d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
5. Submit Product Data before Shop Drawings, and before or concurrently with Samples.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    a. Identification of products.
    b. Schedules.
    c. Compliance with specified standards.
    d. Notation of coordination requirements.
    e. Notation of dimensions established by field measurement.
    f. Relationship and attachment to adjoining construction clearly indicated.
    g. Seal and signature of professional engineer if specified.

C. Samples: Submit Samples for review of type, color, pattern, and texture for a check of these characteristics with other materials.
1. Transmit Samples that contain multiple, related components, such as accessories together in one submittal package.
2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
    a. Project name and submittal number.
    b. Generic description of Sample.

c. Product name and name of manufacturer.

d. Sample source.

e. Number and title of applicable Specification Section.

f. Specification paragraph number and generic name of each item.

3. Email Transmittal: Provide PDF transmittal. Include digital image file illustrating Sample characteristics and identification information for record.

4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

   a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.

   b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

5. Sample Quantities: Submit minimum two physical samples for any product that requires approval or color or texture in addition to the digital submittal. Sample quantity requirement indicated supercedes quantity requirements in individual specification sections.

6. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units, showing the full range of colors, textures, and patterns available.

   a. Number of Samples: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

7. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

   a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.

      1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.

      2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
2. Manufacturer and product name, and model number if applicable.
3. Number and name of room or space.
4. Location within room or space.

E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

G. Certificates:

1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
2. Installer Certificates: Submit written statements on manufacturer's letterhead, certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead, certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
4. Material Certificates: Submit written statements on manufacturer's letterhead, certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead, certifying that product complies with requirements in the Contract Documents.
6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of AWS B2.1/B2.1M on AWS forms. Include names of firms and personnel certified.

H. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for substrate preparation and primers required.

2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
    a. Name of evaluation organization.
    b. Date of evaluation.
    c. Time period when report is in effect.
    d. Product and manufacturers' names.
    e. Description of product.
    f. Test procedures and results.
    g. Limitations of use.

1.07 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a Architect are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
    1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file of certificate, signed and sealed by the responsible Architect, for each product and system specifically assigned to Contractor to be designed or certified by a Architect.
    1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

1.08 CONTRACTOR'S REVIEW

A. Submittals, Action Submittals, and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

B. Contractor's Approval: Indicate Contractor's approval on cover sheet of each submittal for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

C. Where work is indicated “By Others”, Contractor shall indicate responsibility for providing and coordinating such work, whether by subcontractors or under separate contracts. Where no such indication has been provided, it shall be assumed Contractor is self-performing the indicated work.

1.09 ARCHITECT'S REVIEW

A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.

B. Submittals for Information: Architect will acknowledge receipt, but will take no other action.

C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.

D. Architect's actions on items submitted for review:

1. Authorizing purchasing, fabrication, delivery, and installation:

a. "No Exception Taken", or language with same legal meaning.

b. "Make Corrections Noted", or language with same legal meaning.

2. Not Authorizing fabrication, delivery, and installation:

a. "Revise & Resubmit", or language with same legal meaning.

1) Resubmit revised item, with review notations acknowledged and incorporated.

2) Non-responsive resubmittals may be rejected.

1.10 GENERAL, ARCHITECT REVIEW

A. Architect's review or corrections refer only to the general arrangement and conformance of the subject of the submittals with the design concept of the project and with the information given in the Contract Documents. Under no conditions should the Contractor consider the review to include the dimensions, quantities, and details of the items nor the approval of an assembly in which the item functions.

B. Architect's review shall not relieve the Contractor from responsibility for errors or omissions in the submittals.

C. Architect's review of submittals shall not relieve the Contractor of direct responsibility for any deviation from the requirements of the Contract Documents unless the Contractor has directed specific attention to the deviation at the time of submission and the Architect and/or Owner has provided written approval to the specific deviation.

D. Architect's review of submittals shall not be construed as authorization to change the Contract Sum or Contract Time.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 4000

QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner, or code officials are not limited by provisions of this Section.

1.03 DEFINITIONS

A. Experienced: When used with an entity or individual, "experienced," unless otherwise further described, means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

B. Field Quality-Control Tests and Inspections: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, subcontractor, or sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.

1. Use of trade-specific terminology in referring to a Work result does not require that certain construction activities specified apply exclusively to specific trade(s).

D. Mockups: Full-size physical assemblies that are constructed either as freestanding temporary built elements or as part of permanent construction. Mockups are constructed to verify

selections made under Sample submittals; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

1. Laboratory Mockups: Full-size physical assemblies constructed and tested at testing facility to verify performance characteristics.
2. Product Mockups: Mockups that may include multiple products, materials, or systems specified in a single Section.
3. In-Place Mockups: Mockups constructed on-site in their actual final location as part of permanent construction.

E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria. Unless otherwise indicated, copies of reports of tests or inspections performed for other than the Project do not meet this definition.

F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

G. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source (e.g., plant, mill, factory, or shop).

H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. The term "testing laboratory" shall have the same meaning as the term "testing agency."

I. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work, to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

J. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work, to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect or Construction Manager.

1.04 DELEGATED-DESIGN SERVICES

A. Performance and Design Criteria: Where professional design services or certifications by a Architect are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Services Statement: Submit a statement signed and sealed by the responsible Architect, for each product and system specifically assigned to Contractor to be designed or certified by a Architect, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.05 CONFLICTING REQUIREMENTS

A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the Architect regarding the conflict and obtain clarification prior to proceeding with the Work. Refer conflicting requirements that are different, but apparently equal, to Architect for clarification before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.06 SUBMITTALS

A. Includes items indicated as Submittals, Action Submittals, Informational Submittals, and Closeout Submittals.

1.07 ACTION SUBMITTALS

A. Mockup Shop Drawings: For integrated exterior mockups.

1. Include plans, sections, elevations, and details, indicating materials and size of mockup construction.
2. Indicate manufacturer and model number of individual components.
3. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

1.08 INFORMATIONAL SUBMITTALS

A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.

B. Qualification Data: For Contractor's quality-control personnel.

C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:

1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
2. Primary wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.

D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

F. Reports: Prepare and submit certified written reports and documents as specified.

G. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.09 CONTRACTOR'S QUALITY-CONTROL PLAN

A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice of Award, and not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities and to coordinate Owner's quality-assurance and quality-control activities. Coordinate with Contractor's Construction Schedule.

B. Quality-Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
1. Project quality-control manager shall not have other Project responsibilities.

C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:

1. Contractor-performed tests and inspections, including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. Distinguish source quality-control tests and inspections from field quality-control tests and inspections.
2. Special inspections required by authorities having jurisdiction and indicated on the Statement of Special Inspections.
3. Owner-performed tests and inspections indicated in the Contract Documents.
4. Owner-performed tests and inspections indicated in the Contract Documents, including tests and inspections indicated to be performed by Commissioning Authority.

E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring the Work into compliance with standards of workmanship established by Contract requirements and approved mockups.

F. Monitoring and Documentation: Maintain testing and inspection reports, including log of approved and rejected results. Include Work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming Work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.10 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.
3. Name, address, telephone number, and email address of testing agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection method.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample-taking and testing and inspection.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.

13. Recommendations on retesting and reinspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of technical representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement of whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement of whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

1.11 QUALITY ASSURANCE

A. Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that is similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged in the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing and Inspecting Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented in accordance with ASTM E329, and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect, demonstrate, repair, and perform service on installations of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following Contractor's responsibilities, including the following:

1. Provide test specimens representative of proposed products and construction.
2. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
3. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
4. Build site-assembled test assemblies and mockups, using installers who will perform same tasks for Project.
5. Build laboratory mockups at testing facility, using personnel, products, and methods of construction indicated for the completed Work.

6. When testing is complete, remove test specimens and test assemblies, and mockups; do not reuse products on Project.
7. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections, and state in each report whether tested and inspected Work complies with or deviates from the Contract Documents.

K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups of size indicated.
2. Build mockups in location indicated or, if not indicated, as directed by Architect.
3. Notify Architect seven days in advance of dates and times when mockups will be constructed.
4. Employ supervisory personnel who will oversee mockup construction. Employ workers who will be employed to perform same tasks during the construction at Project.
5. Demonstrate the proposed range of aesthetic effects and workmanship.
6. Obtain Architect's approval of mockups before starting corresponding Work, fabrication, or construction.
7. Obtain Architect's[and Construction Manager's] approval of mockups before starting corresponding Work, fabrication, or construction.
    a. Allow fourteen business days for initial review and each re-review of each mockup.
8. Promptly correct unsatisfactory conditions noted by Architect's preliminary review, to the satisfaction of the Architect, before completion of final mockup.
9. Approval of mockups by the Architect does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
10. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
11. Demolish and remove mockups when directed unless otherwise indicated.

L. Integrated Exterior Mockups: Construct integrated exterior mockup according to approved Shop Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials. Comply with requirements in "Mockups" Paragraph.
1. Coordinate construction of the mockup to allow observation of air barrier installation, flashings, air barrier integration with fenestration systems, and other portions of the building air/moisture barrier and drainage assemblies, prior to installation of veneer, cladding elements, and other components that will obscure the work.

M. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Specification Sections.

1.12 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
2. Payment for these services will be made from testing and inspection allowances specified in Section 012100 "Allowances," as authorized by Change Orders.
3. Costs for retesting and reinspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.

1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
2. Notify testing agencies at least 72 hours in advance of time when Work that requires testing or inspection will be performed.
3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
4. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

D. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections, and state in each report whether tested and inspected Work complies with or deviates from requirements.

4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform duties of Contractor.

E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."

F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

G. Contractor's Associated Requirements and Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Delivery of samples to testing agencies.
6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
7. Security and protection for samples and for testing and inspection equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit concurrently with Contractor's Construction Schedule. Update and submit with each Application for Payment.

1. Schedule Contents: Include tests, inspections, and quality-control services, including Contractor- and Owner-retained services, commissioning activities, and other Project-required services paid for by other entities.

2. Distribution: Distribute schedule to Owner, Architect, Contractor, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Architect.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's and authorities' having jurisdiction reference during normal working hours.

1. Submit log at Project closeout as part of Project Record Documents.

3.02 REPAIR AND PROTECTION

A. General: On completion of testing, inspection, sample-taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01 7300 "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

SECTION 01 4200

REFERENCES

PART 1 GENERAL

1.01 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

J. "Architect": Refers to the Architect or Engineer directly responsible for the design of the specific item referenced.

1.02 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents. Any date listed shall be superceded by standards in effect as of date of Contract Documents.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 5000

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:

1. Section 01 1000 - Summary: For work restrictions and limitations on utility interruptions.

1.02 USE CHARGES

A. Installation, removal, and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, testing agencies, and authorities having jurisdiction.

B. Sewer Service: Pay sewer-service use charges for sewer usage by all entities for construction operations.

C. Water Service: Pay water-service use charges for water used by all entities for construction operations.

D. Electric Power Service: Pay electric-power-service use charges for electricity used by all entities for construction operations.

1.03 SUBMITTALS

A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.

B. Implementation and Termination Schedule: Within 15 days of date established for commencement of the Work, submit schedule indicating implementation and termination dates of each temporary utility.

C. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.

D. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

E. Moisture- and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold. Describe delivery,

handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.

1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and requirements for replacing water-damaged Work.
2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
3. Indicate methods to be used to avoid trapping water in finished work.

F. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:

1. Locations of dust-control partitions at each phase of work.
2. HVAC system isolation schematic drawing.
3. Location of proposed air-filtration system discharge.
4. Waste-handling procedures.
5. Other dust-control measures.

G. Noise and Vibration Control Plan: Identify construction activities that may impact the occupancy and use of adjacent existing buildings, whether occupied by others, or occupied by the Owner. Include the following:

1. Methods used to meet the goals and requirements of the Owner.
2. Concrete cutting method(s) to be used.
3. Location of construction devices on the site.
4. Show compliance with the use and maintenance of quieted construction devices for the duration of the Project.
5. Indicate activities that may disturb building occupants and that are planned to be performed during non-standard working hours as coordinated with the Owner.

1.04 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

C. Accessible Temporary Egress: Comply with applicable provisions in the United States Access Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.05 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 PRODUCTS

2.01 MATERIALS

A. Chain-Link Fencing: Minimum 2-inch, 0.148-inch-thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch-OD line posts and 2-7/8-inch-OD corner and pull posts, with 1-5/8-inch-OD top rails.

B. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch-thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch-OD top and bottom rails. Provide galvanized-steel bases for supporting posts.

2.02 TEMPORARY FACILITIES

A. Field Offices: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1. Store combustible materials apart from building.

2.03 EQUIPMENT

A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.

2. Heating, Cooling, and Dehumidifying Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.

3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction and clean HVAC system as required in Section 01 7700 - Closeout Procedures.

C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 EXECUTION

3.01 TEMPORARY FACILITIES, GENERAL

A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

3.02 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

1. Locate facilities to limit site disturbance as specified in Section 01 1000 - Summary.

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.03 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.

C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.

D. Sanitary Facilities: Provide temporary toilets, wash facilities, safety shower and eyewash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

1. Use of Permanent Toilets: Use of Owner's existing or new toilet facilities is not permitted.

E. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.

F. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.

1. Install electric power service overhead unless otherwise indicated.

G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

H. Miscellaneous Electronic Equipment:

1. Printer: "All-in-one" unit equipped with printer server, combining color printing, photocopying, scanning, and faxing, or separate units for each of these three functions. Printer shall be connected for printing via WiFi.

2. Internet Service: Broadband modem, router, and ISP, equipped with hardware firewall, providing minimum 10.0-Mbps upload and 15-Mbps download speeds at each computer.

3. High speed WiFi internet service, security protected, with password provided for Owner, Architect, third party Consultants, and project Engineers.

3.04 SUPPORT FACILITIES INSTALLATION

A. Comply with the following:

1. Provide construction for temporary field offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible in accordance with ASTM E136. Comply with NFPA 241.

2. Contractor shall have option to transition from their site trailer office to the parking garage during construction when approved by Architect.

3. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.

1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.

C. Temporary Use of Planned Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.

1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
2. Prepare subgrade and install subbase and base for temporary roads and paved areas in accordance with Section 31 2000 - Earth Moving.
3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.

D. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain, including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

E. Parking: Provide temporary offsite or use designated areas of Owner's existing parking areas for construction personnel.

F. Storage and Staging: Provide temporary offsite area or use designated areas of Project site for storage and staging needs.

G. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

H. Project Signs: Provide Project signs as indicated. Submit shop drawing for Architect’s approval. Unauthorized signs are not permitted.

1. Identification Signs: Provide Project identification signs as indicated on Drawings.
2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
    a. Provide temporary, directional signs for construction personnel and visitors.
3. Maintain and touch up signs, so they are legible at all times.

I. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 01 7300 - Execution.

J. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

K. Temporary Stairs:

1. Until permanent stairs are available, provide temporary stairs where ladders are not adequate.

L. Temporary Use of New Permanent Elevators:

1. Temporary use of new elevators is not permitted.

M. Temporary Use of New Permanent Stairs:

1. Temporary use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.05 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

1. Comply with work restrictions specified in Section 01 1000 - Summary.

C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.

1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant-protection zones.

2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.

4. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.

D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

E. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

F. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals, so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.

G. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.

1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.

H. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.

I. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

J. Temporary Egress: Provide temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction. Provide signage directing occupants to temporary egress.

K. Covered Walkway: Erect protective, covered walkway for passage of individuals through or adjacent to Project site. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction.

1. Provide overhead decking, protective enclosure walls, handrails, barricades, warning signs, exit signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage.

2. Paint and maintain appearance of walkway for duration of the Work.

L. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.

M. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.

1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.

2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition in accordance with requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign, stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.06 MOISTURE AND MOLD CONTROL

A. Moisture and Mold Protection: Protect stored materials and installed Work in accordance with Moisture and Mold Protection Plan.

B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
1. Protect porous materials from water damage.
2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.
4. Remove standing water from decks.
5. Keep deck openings covered or dammed.

C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
2. Keep interior spaces reasonably clean and protected from water damage.
3. Periodically collect and remove waste containing cellulose or other organic matter.
4. Discard or replace water-damaged material.
5. Do not install material that is wet.
6. Discard and replace stored or installed material that begins to grow mold.
7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.

D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
1. Control moisture and humidity inside building by maintaining effective dry-in conditions.

2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
    a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective and require replacing.
    b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
    c. Remove and replace materials that cannot be completely restored to their manufactured moisture level within 48 hours.

3.07 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.
1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.

3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 7700 - Closeout Procedures.

END OF SECTION

SECTION 01 5639

TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section contains specifications for the general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.
B. Section includes
   1. Protection Fencing
   2. Protective Mulching
   3. Pruning
   4. Air Spading

1.02 RELATED SECTIONS

A. Section 32 9113 – Soil Preparation
B. Section 32 9300 – Plants

1.03 REFERENCES

A. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
   1. Unless otherwise noted, the Referenced Standard Edition is considered the current edition at the time of commencement of construction.
B. American Standard for Nursery Stock (ANSI)
C. Guide for Plant Appraisal by the Council of Tree and Landscape Appraisers

1.04 DEFINITIONS

A. Acceptance: Wherever the terms acceptance or accepted are used herein, they mean acceptance of the Landscape Architect in writing.
B. Critical Root Zone (CRZ): The portion of the root system that is the minimum necessary to maintain vitality or stability of the tree. The CRZ must extend two-feet beyond the dripline of the tree; therefore, on Drawings, the CRZ is simply shown as a radius measure equal to one-foot radius for every one-inch of diameter breast height (DBH). Note that this line is for representational purposes only, but does not represent the true CRZ.
C. Drip Line: The outer most leaves of a tree that defines the visible outer edge of the tree. Note that this line is not a consistent circle. The drip line follows the irregular edge of the tree canopy.
D. Finished Grade: Elevation of finished surface of planting soil.

E. Protection Zone: Area surrounding protected site elements, explicitly individual trees or groups of trees to be protected during construction as indicated on Drawings. Note that the Protection Zone for trees is consistent with the CRZ, which may or not be shown on the Drawings with protection fencing.
F. Root Flare: The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots. Also called "trunk flare," this is the area of transition between the root system and the stem or trunk.
G. Subgrade: The soil surface on which aggregate base or cement-treated base is placed.
H. Tree Trunk: The main stem of a tree, usually covered with bark.

1.05 SUBMITTALS

A. Action Submittals
   1. Installer Qualifications: Copy of the Louisiana arborist's license and insurance. A summary of the arborist's work experience.
   2. Product Data: Documentation for each type of product indicated herein.
      a. Fencing
      b. Mulch
   3. Product Samples: Sealed containers or bags containing each type of organic mulch. The samples will be separated and labeled.
      a. The labels will include the composition of materials by percentage of weight.
   4. Mock-up: A section of the protection zone fencing that includes the protection-zone signage.

B. Informational Submittals
   1. Material Certificates: Certification from a Louisiana licensed arborist, certifying that trees indicated as protected and/or to remain have been safeguarded during construction according to recognized standards.
   2. Work Schedules: Written schedule stating in detail the scope and date(s) for tree protection installation as well as associated pruning of existing trees that interfere with construction.

C. Closeout Submittals
   1. Operations and Maintenance Instructions: Documents from Louisiana licensed arborist, describing the care and protection of trees affected by construction during and after completing the Work.
   2. Record Set / As-Built Drawings: Photographic documentation of the protected tree(s) at the conclusion of the Work. Submit at least three photos per tree showing an alternate side of the tree. The photo must include the ground as well as the trunk and crown of the tree. Submit additional photographs to ensure these three elements are clearly visible. Submit an annotated plan associating the photos with their respective trees on site.

1.06 QUALITY ASSURANCE

A. The Contractor shall maintain an experienced full-time supervisor on site when this scope is in progress. The supervisor shall have successfully completed work similar in design, material, and extent indicated on this project and scope.
B. Pre-installation Meeting: Hold a pre-installation conference, prior to the installation of this scope.
    1. Attendees shall include the Contractor and Landscape Architect.
    2. The meeting agenda will include a review of the product installation requirements, status of site preparation, areas of potential conflicts, and the installer qualifications.
    3. The Contractor shall present a schedule for the installation of this scope as well as a description of the means and methods to be utilized during construction.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.
B. Comply with manufacturer's delivery and storage instructions to avoid degrading the materials.
    1. Delivery: Materials will be delivered in the manufacturer's original, unopened, undamaged containers packaging with identification labels intact.
    2. Storage and protection: Materials will be stored and protected such that they are kept free from mud, dirt, and other foreign materials. Do not store or stockpile materials atop exposed dirt or roots located with the tree protection zone.

1.08 PROJECT SITE CONDITIONS

A. Install all products associated with this scope as recommended by the product manufacturer.
B. Environmental Requirements:
    1. Ensure fencing and signage are secure and able to withstand heavy rain and wind.
    2. Do not direct vehicle or equipment exhaust toward protection zones.
    3. Do not direct heat sources, open flames, ignition sources, and smoking within the protection zones, specifically the organic mulch.
C. The following practices are prohibited within protection zones:
    1. Storing of construction materials, site debris, or excavated materials.
    2. Parking and/or driving vehicles or equipment.
    3. Walking, biking, skating, or other forms of foot traffic.
    4. Erecting a shed or structures, specifically structures with below grade footings.
    5. Excavating or digging, unless otherwise indicated.
    6. Attaching signs to trees or plants
    7. wrapping materials around trees or plants, unless otherwise indicated.
    8. Impoundment of water.
    9. Discharge of water, unless otherwise indicated.
    10. Discharge chemicals, paints, thinners, and/or other compounds deemed detrimental to the health of the tree.
    11. Cutting tree limbs, trunks, and/or roots.
    12. Hitting tree limbs, trunks, and/or roots with construction equipment and/or tools.

1.09 MAINTENANCE

A. Contractor is responsible for product maintenance from purchase until Final Acceptance.
B. Contractor is responsible for protecting work from damage throughout construction.
C. Contractor is expected to clean and/or replace all materials that appear cracked, chipped, marked, vandalized, dirtied, etc. during the construction process.

1.10 WARRANTY

A. Installer agrees to repair or replace products and accessories that fail in materials and/or workmanship within a specified warranty period.
    1. Failures include, but are not limited to, the following:
        a. Collapse or damage of fencing
        b. Loss of fencing
        c. Loss of mulch
        d. Loss of signage
        e. Loss of ability to read signage
B. Warranty Periods: From date of Work Commencement until date of Substantial Completion.

1.11 LIQUIDATED DAMAGES

A. The contractor shall be assessed Liquidated Damages for conducting prohibited practices within a tree protection zone.
    1. Liquidated damages will be applied when damage results in a 5% or more biomass reduction, such as but not limited to loss of significant branch and/or crown.
    2. Liquidated damages will be applied when damage results in a 10% or more leaf reduction, such as but not limited to premature leaf drop or dieback.
    3. Liquidated damages will be applied when damage results in a 5% or more bark removal that exposes cambium tissues.
B. Each tree identified for protection and preservation has been evaluated and assessed its value in accordance with “The Guide for Plant Appraisal” by the Council of Tree and Landscape Appraisers.
C. Damage assessments in the amount of the percentage of the prohibited practice’s severity will be multiplied by the dollar value of the affected tree to determine the cost of the liquidated damages.
    1. Liquidated Damage fees for private trees will be issued and collected as a credit to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Organic Mulch: Refer to specification 32 9300 - Plants
B. Flexible Protection-Zone Fencing: 4-foot height fencing, fixed in position and meeting the following requirements.

1. Flexible fencing may only be used when designated in the Construction Drawings.
2. Pipe Posts and Rails: Vertical wood or metal stakes embedded into the ground, minimum 2-3/8-inch OD line stakes, and 2-7/8-inch OD corner and pull stakes; attached with zip-cords and other accessories for a complete fence system.
    a. Stakes: stakes will be placed at a 4-foot spacing and embedded a minimum of 12-inches deep.
3. Fencing Fabric: Safety Fence – Standard; reusable plastic mesh material; orange color; 4-foot height; 15-mil Thickness; 132-lbs/foot Tensile Strength.
4. Geotextile Silt Fabric: 18-inch height, placed at base along exterior (side opposite protected tree) of fence, turn down fabric away from chain-link fabric and pin 4-inches of fabric to ground. Cover turn down (skirt) area with mulch so that mulch is continuous throughout the tree protection zone, excluding hardscape.

C. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes pre-punched and reinforced; legibly printed with nonfading lettering.
    1. Signage Attachment Wire: malleable aluminum wire.

2.02 ADDITIVES

A. Only a Louisiana Licensed Arborist may prescribe and apply soil amendments and soil amendments cannot be applied without written consent from the Landscape Architect.
    1. Growth Regulators: Cambistat or equal
    2. Mycorrhizal Fungi
    3. Slow-Release Fertilizers: 17-3-6 NPK or equal

PART 3 - EXECUTION

3.01 EXAMINATION

A. The Contractor shall examine the site, prior to execution of this scope, noting potential conflicts or changes that may inhibit the work from being installed as indicated on the Drawings.
    1. The Contractor shall notify the Landscape Architect immediately upon discovery of a conflict.

B. Inspections: Engage a qualified Louisiana licensed arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

C. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place.
    1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

3.02 PREPARATION

A. Field Quality Control: Protect structure, utilities, pavements, plantings, and other existing site elements from damage caused by the installation of this scope.

1. Protect adjacent and adjoining areas.
2. Protect grade stakes set by others until directed to remove them.

B. Site Conditions: Check existing surface elevations for conformance to survey.

1. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials.
2. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

C. Protection Zones: Mulch areas inside protection zones and other areas indicated with 3-inch average depth of organic mulch. Do not place mulch within 6 inches of tree trunks. Maintain any existing turf grass within the protection zones as follows. Turf shall not exceed 3-inch height. Remove no more than 1/3 of grass-leaf growth in initial or subsequent mowing.

3.03 INSTALLATION

A. Comply with municipal written installation instructions unless more stringent requirements are indicated.
B. Consult with Landscape Architect prior to the final installation allowing the Landscape Architect to verify locations and adjust as necessary.
C. Excavation

1. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Section "Earth Moving."
2. Trenching near Trees: Where utility trenches are required within protection zones, hand excavate under or around tree roots or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning.
3. Do not allow exposed roots to dry out before placing permanent backfill.

D. Root Pruning

1. Prune roots that are affected by temporary and permanent construction. Prune roots as follows:
    a. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts.
        1) Do not use a backhoe or other equipment that rips, tears, or pulls roots.
    b. Until the roots are permanently covered with soil temporarily support and protect them from damage.
        1) Cover exposed roots with burlap and water regularly.
2. Prune roots at the edge of the Protection Zone by cleanly cutting all roots to the depth of the required excavation. Prune roots as stated above with the following additional considerations:
    a. Within the Protection Zone, clear and excavate by hand to the depth of the required excavation to minimize damage to root systems.
    b. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

E. Crown Pruning

1. Prune branches that are affected by temporary and permanent construction. Prune branches as follows:
    a. Prune trees to remain to compensate for root loss caused by damaging or cutting root system.
    b. Cut branches with sharp pruning instruments; do not break or chop.
        1) Pruning Standards: Prune trees according to ANSI A300 (Part 1)
        2) Do not apply pruning arborist paint to cut areas (tree wounds).
    c. Provide subsequent maintenance during Contract period, as recommended by Arborist.

F. Air Spading

1. When construction improvements occur within the CRZ of a protected tree, the Contractor must have the entire CRZ air spaded by a Louisiana licensed arborist, as follows:
    a. The arborist may only perform the air-spading remediation after construction work within the CRZ has concluded but prior to substantial completion.
    b. Backfilled the air spaded CRZ area with bioretention soil
        1) Refer to specification 32 91 16 – Soil Preparation.
    c. Top the CRZ with fresh 3-inch layer of organic mulch.
        1) Refer to specification 32 93 00 - Plants.

G. Regrading

1. Maintain existing grades within the CRZ.
    a. DO NOT FILL within the drip line of any tree.
    b. Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone.
    c. Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone.

H. Erecting Protection-Zone Fence

1. Install protection-zone fencing along edges of protection zones in a manner that will prevent people from easily entering protected areas except by entrance gates.
    a. Drive posts into ground one-third the total height of the fence without concrete footings.
        1) Where a post is located on existing solid hardscape (labeled to remain), provide appropriate and accepted means of post support.
        2) Post supports may not be used atop modular paving.
    b. Install chain-link fence fabric to comply with ASTM F 567 and with manufacturer's written instructions.
    c. Install access gates and silt fencing.
2. Install protection-zone signage in visibly prominent locations in a manner approved by Landscape Architect.

I. Field Quality Control

1. Reinspect the site daily throughout construction, ensuring the trees are fully protected.
    a. Fencing must continuously remain erect and in place to identify and protect the Tree Protection Zone.
    b. Construction equipment may never be stored in the Tree Protection Zone.
    c. Construction materials may never be stored in the Tree Protection Zone.

J. Repair and Replacement

1. Repair or prune trees, shrubs, and other vegetation, indicated to remain or be relocated, that is damaged by construction operations.
    a. Submit written repair and pruning work proposal for approval by Landscape Architect.
    b. Repair and pruning work will come at no additional cost to the Owner.
    c. Have a Louisiana licensed arborist perform root cutting, branch pruning, and damage repair of trees and shrubs.
    d. If necessary, treat damaged trunks, limbs, and roots according to arborist's written instructions.
        1) Treatments must be approved in writing by the landscape architect prior to application.
    e. Perform repairs or pruning within 24 hours.
2. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by Landscape Architect.
    a. Submit written replacement work proposal for approval by Landscape Architect.
    b. Replacement work will come at no additional cost to the Owner.
    c. Have a Louisiana licensed landscape contractor install the replacement of trees and shrubs.
    d. Perform replacement within two weeks.

K. Disposal of Surplus and Waste Materials

1. Remove excess excavated material, displaced trees, trash and debris, and legally dispose of them off Owner's property.

3.04 TOLERANCES

A. Fence height may not exceed 6-inch height of minimum.
B. Fences must include a minimum of two signs that face opposite directions.
C. Mulch depth may not exceed 1-inch minimum.

3.05 CLEANING

A. The Contractor shall maintain the installed work, related to this scope, as recommended by the associated product and material manufacturers as well as ASTM standards.

3.06 REVIEW

A. The Contractor shall notify the Landscape Architect as key portions of the work is completed.

B. The Landscape Architect will visit the site to review the work.

3.07 MAINTENANCE

A. The Contractor shall maintain the installed work, related to this scope, as recommended by the associated product and material manufacturers as well as ASTM standards.
B. Maintain protection zone fencing and signage in good condition throughout entire demolition and construction phase, as acceptable to Landscape Architect.
C. Remove fencing when construction operations are complete and construction equipment as well as tools has been removed from the project site.

3.08 PROTECTION

A. After work in this section is complete, the Contractor shall be responsible for protecting work from damage due to subsequent construction activity on the site.

3.09 DAMAGES ASSESSMENT

A. When a protected tree is damaged, a professional assessment must be conducted.
    1. A Louisiana licensed arborist must do the assessment.
    2. The assessment must declare the tree's species and size as well as describe the tree's condition.
    3. The assessment must provide a recommendation to the Owner stating whether the tree must be removed, or the necessary measures required to salvage the tree.
B. Photo documentation of the tree is required with the assessment.
    1. Summit at least three photos of the tree that each show an alternate side of the tree as well as three photos of the damage.
        a. At least one of the photos must include the ground as well as the trunk and crown of the tree.
        b. Submit additional photographs to ensure these three elements are clearly visible.
C. The Landscape Architect must approve the arborist's assessment and recommendations prior to the commencement of tree remediation work.
D. The Contractor is held financially responsible for arborist fees and work associated with tree recover as well as associated liquidated damages.

END OF SECTION

SECTION 01 6000

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:

1. Section 01 1000 - Summary: For Contractor requirements related to Owner-furnished products.
2. Section 01 2100 - Allowances: For products selected under an allowance.
3. Section 01 2300 - Alternates: For products selected under an alternate.
4. Section 01 2500 - Substitution Procedures: For requests for substitutions.
5. Section 01 4200 - References: For applicable industry standards for products specified.
6. Section 01 7700 - Closeout Procedures: For submitting warranties.

1.02 COMPLIANCE OF WORK - LOCAL, STATE, AND FEDERAL

A. All work of this project shall comply with the requirements of applicable project building codes and regulations. Where conflict or ambiguity exists, request clarification of requirements from Architect. Compliance includes, but is not limited to, the following:

1. Exterior cladding and fenestration components.
2. Insulation requirements.
3. Environmental regulations.
4. Accessibility requirements.
5. Local, state, and Federal requirements.

B. Contractor shall coordinate with applicable codes and regulations for the State of Louisiana.

1.03 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Salvaged items or items reused from other projects are not considered new

products. Items that are manufactured or fabricated to include recycled content materials are considered new products, unless indicated otherwise.

3. Comparable Product: Product by named manufacturer that is demonstrated and approved through the comparable product submittal process described in Part 2 "Comparable Products" Article, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.

1. Evaluation of Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. Manufacturer's published attributes and characteristics of basis-of-design product also establish salient characteristics of products for purposes of evaluating comparable products.

C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; submit a comparable product request or substitution request, if applicable.

D. Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:

1. Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.

2. Data indicating compliance with the requirements specified in Part 2 "Comparable Products" Article.

E. Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 01 3300 - Submittal Procedures.

F. Substitution: Refer to Section 01 2500 - Substitution Procedures, for definition and limitations on substitutions.

1.04 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1. Resolution of Compatibility Disputes between Multiple Contractors:

a. Contractors are responsible for providing products and construction methods compatible with products and construction methods of other contractors.

b. If a dispute arises between the multiple contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.

1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is not conspicuous.

2. Equipment Nameplates: Provide a permanent nameplate on each item of service- or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:

a. Name of product and manufacturer.

b. Model and serial number.

c. Capacity.

d. Speed.

e. Ratings.

3. See individual identification Sections in Divisions 21, 22, 23, and 26 for additional equipment identification requirements.

1.05 COORDINATION

A. Modify or adjust affected work as necessary to integrate work of approved comparable products and approved substitutions.

1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products, using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.

2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and that products are undamaged and properly protected.

C. Storage:
1. Provide a secure location and enclosure at Project site for storage of materials and equipment.
2. Store products to allow for inspection and measurement of quantity or counting of units.
3. Store materials in a manner that will not endanger Project structure.
4. Store products that are subject to damage by the elements under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation and with adequate protection from wind.
5. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.

D. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
1. Manufacturer's Warranty: Written standard warranty form furnished by individual manufacturer for a particular product and issued in the name of the Owner or endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner and issued in the name of the Owner or endorsed by manufacturer to Owner.

E. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included in the Project Manual, prepare a written document, using indicated form properly executed.

3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

F. Submittal Time: Comply with requirements in Section 01 7700 - Closeout Procedures.

PART 2 PRODUCTS

2.01 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

B. Product Selection Procedures:

1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
    a. Sole product may be indicated by the phrase "Subject to compliance with requirements, provide the following."
2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
    a. Sole manufacturer/source may be indicated by the phrase "Subject to compliance with requirements, provide products by the following."
3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.
4. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.

5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications may additionally indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
    a. For approval of products by unnamed manufacturers, comply with requirements in Section 01 2513 - Product Substitution Procedures, for substitutions for convenience.

C. Visual Matching Specification: Where Specifications require the phrase "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
    1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 2500 - Substitution Procedures, for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or a similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.02 COMPARABLE PRODUCTS

A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with the following requirements:
    1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work.
    2. Detailed comparison of significant qualities of proposed product with those of the named basis-of-design product. Significant product qualities include attributes, such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
    3. Evidence that proposed product provides specified warranty.
    4. List of similar installations for completed projects, with project names and addresses and names and addresses of architects and owners, if requested.
    5. Samples, if requested.

B. Architect's Action on Comparable Products Submittal: If necessary, Architect will request additional information or documentation for evaluation, as specified in Section 01 3300 "Submittal Procedures."

1. Form of Approval of Submittal: As specified in Section 01 3300 "Submittal Procedures."
2. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

C. Submittal Requirements, Two-Step Process: Approval by the Architect of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 7300

EXECUTION

PART 1 GENERAL

1.01 SUMMARY

A. Section includes general administrative and procedural requirements governing execution of the Work, including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Coordination of Owner's portion of the Work.
5. Coordination of Owner-installed products.
6. Progress cleaning.
7. Starting and adjusting.
8. Protection of installed construction.

B. Related Requirements:

1. Section 01 1000 - Summary: For coordination of Owner-furnished products and limits on use of Project site.
2. Section 01 3300 - Submittal Procedures: For submitting surveys.
3. Section 01 7700 - Closeout Procedures: For submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.

1.02 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

C. Alteration Work: This term includes remodeling and renovation performed within existing spaces or on existing surfaces as part of the Project.

D. Consolidate: To strengthen loose or deteriorated materials in place.

E. Design Reference Sample: A sample that represents the Architect's prebid selection of work to be matched; it may be existing work or work specially produced for the Project.

F. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Architect.

G. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.

H. Repair: To correct damage and defects, retaining existing materials, features, and finishes. This includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.

I. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.

J. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.

K. Reproduce: To fabricate a new item, accurate in detail to the original, and from either the same or a similar material as the original, unless otherwise indicated.

L. Retain: To keep existing items that are not to be removed or dismantled.

M. Strip: To remove existing finish down to base material unless otherwise indicated.

1.03 PREINSTALLATION MEETINGS

A. Cutting and Patching Conference: Conduct conference at Project site.

1. Prior to commencing work requiring cutting and patching, review extent of cutting and patching anticipated and examine procedures for ensuring satisfactory result from cutting and patching work. Inform Architect of scheduled meeting. Require representatives of each entity directly concerned with cutting and patching to attend, including the following:

a. Contractor's superintendent.

b. Trade supervisor responsible for cutting operations.

c. Trade supervisor(s) responsible for patching of each type of substrate.

d. Mechanical, electrical, and utilities subcontractors' supervisors, to the extent each trade is affected by cutting and patching operations.

2. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

B. Layout Conference: Conduct conference at Project site.

1. Prior to establishing layout of new perimeter and structural column grid(s), review building location requirements. Review benchmark, control point, and layout and dimension requirements. Inform Architect of scheduled meeting. Require representatives of each entity directly concerned with Project layout to attend, including the following:

a. Contractor's superintendent.

b. Professional surveyor or Professional engineer, responsible for performing Project surveying and layout.

c. Professional surveyor or Professional engineer responsible for performing site survey serving as basis for Project design.

2. Review meanings and intent of dimensions, notes, terms, graphic symbols, and other layout information indicated on the Drawings.

3. Review requirements for including layouts on Shop Drawings and other submittals.

4. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.04 INFORMATIONAL SUBMITTALS

A. Qualification Data: For land surveyor or professional engineer.

B. Certified Surveys: Submit two copies signed by land surveyor or professional engineer.

C. Certificates: Submit certificate signed by land surveyor or professional engineer, certifying that location and elevation of improvements comply with requirements.

1.05 CLOSEOUT SUBMITTALS

A. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

1.06 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

B. Professional Engineer Qualifications: Refer to Section 014000 "Quality Requirements."

C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of specified products and equipment.

D. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, or when encountering the need for cutting and patching of elements whose structural function is not known, proceed as follows:

a. Notify Architect of locations and details of cutting and await directions from Architect before proceeding.

b. Shore, brace, and support structural elements during cutting and patching.

c. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.

2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:

a. Primary operational systems and equipment.
b. Fire separation assemblies.
c. Air or smoke barriers.
d. Fire-suppression systems.
e. Plumbing piping systems.
f. Mechanical systems piping and ducts.
g. Control systems.
h. Communication systems.
i. Fire-detection and -alarm systems.
j. Conveying systems.
k. Electrical wiring systems.
l. Operating systems of special construction.

3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
   a. Water, moisture, or vapor barriers.
   b. Membranes and flashings.
   c. Sprayed fire-resistive material.
   d. Equipment supports.
   e. Piping, ductwork, vessels, and equipment.
   f. Noise- and vibration-control elements and systems.
4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

PART 2 PRODUCTS

2.01 MATERIALS

A. Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials. Use materials that are not considered hazardous.

C. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

2. Use cleaning products that comply with one of the following. The most stringent requirement shall apply.

a. Cleaning products that comply with Green Seal's GS-37.

b. Cleaning products that comply with the the State of Louisiana maximum allowable VOC levels.

c. Cleaning products that comply with United States Environmental Protection Agency (EPA) regulations including current Clean Air Act (CAA) requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, gas service piping, and water-service piping; underground electrical services; and other utilities.

2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.

2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.

3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work, including Specification Section number and paragraph, and Drawing sheet number and detail, where applicable.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.02 PREPARATION

A. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect.

3.03 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks and existing conditions. If discrepancies are discovered, notify Architect promptly.

B. Engage a land surveyor or professional engineer experienced in laying out the Work, using the following accepted surveying practices:

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish limits on use of Project site.
3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
4. Inform installers of lines and levels to which they must comply.
5. Check the location, level and plumb, of every major element as the Work progresses.

6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.04 FIELD ENGINEERING

A. Identification: Contractor shall identify existing benchmarks, control points, and property corners.

B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

3.05 INSTALLATION

A. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb, and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces, unless otherwise indicated on Drawings.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure satisfactory results as judged by Architect. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations, so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy of type expected for Project.

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on-site and placement in permanent locations.

F. Tools and Equipment: Select tools or equipment that minimize production of excessive noise levels.

G. Templates: Obtain and distribute to the parties involved templates for Work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions with manufacturer.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

I. Joints: Make joints of uniform width. Where joint locations in exposed Work are not indicated, arrange joints for the best visual effect, as judged by Architect. Fit exposed connections together to form hairline joints.

J. Repair or remove and replace damaged, defective, or nonconforming Work.

1. Comply with Section 01 7700 "Closeout Procedures" for repairing or removing and replacing defective Work.

K. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.06 COORDINATION OF OWNER'S PORTION OF THE WORK

A. Site Access: Provide access to Project site for Owner's construction personnel.

1. Provide temporary facilities required for Owner-furnished, Contractor-installed products.

2. Refer to Section 01 1000 "Summary" for other requirements for Owner-furnished, Contractor-installed products

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.

2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.07 CUTTING AND PATCHING

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

C. Temporary Support: Provide temporary support of Work to be cut.

D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements in Section 011000 "Summary."

F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and

with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as practicable, as judged by Architect. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
    a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.
3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
    a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch, corner to corner of wall and edge to edge of ceiling. Provide additional coats until patch blends with adjacent surfaces.
4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.08 PROGRESS CLEANING

A. Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
    a. Use containers intended for holding waste materials of type to be stored.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where Work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 5000 - Temporary Facilities and Controls. Three paragraphs below reduce or eliminate the need for similar provisions in other Sections. Insert other provisions needed because of unusual Project conditions. Specify unusual provisions for specific work in the individual Section.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.09 STARTING AND ADJUSTING

A. Coordinate startup and adjusting of equipment and operating components.

B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

E. Manufacturer's Field Service: Comply with qualification requirements in Section 01 4000 - Quality Requirements.

3.10 PROTECTION AND REPAIR OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Repair Work previously completed and subsequently damaged during construction period. Repair to like-new condition.

C. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION

SECTION 01 7419

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Salvaging, recycling, and disposing of construction waste.

1.03 DEFINITIONS

A. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.

C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner's property.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.04 MATERIALS OWNERSHIP

A. Unless otherwise indicated construction waste becomes property of contractor.

1.05 SUBMITTALS

A. Waste Management Plan: Submit plan within 30 days of date established for commencement of the Work.

1.06 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with transportation and disposal regulations of authorities having jurisdiction.

B. Waste Management Conference(s): Conduct conference(s) at Project site to comply with requirements in Section 01 3100 - Project Management and Coordination. Review methods and procedures related to waste management including, but not limited to, the following:

1. Review and discuss waste management plan including responsibilities of each contractor and waste management coordinator.
2. Review requirements for documenting quantities of each type of waste and its disposition.
3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
5. Review waste management requirements for each trade.

1.07 WASTE MANAGEMENT PLAN

A. General: Develop a waste management plan according to requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Distinguish between demolition and construction waste, as applicable. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. General: Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials, including the following:

1. Packaging: Regardless of any other salvage/recycle goals indicated, salvage or recycle 100 percent of the following uncontaminated packaging materials:
   a. Paper.
   b. Cardboard.
   c. Boxes.
   d. Wood crates.
   e. Wood pallets.
2. Construction Office Waste: Regardless of any other salvage/recycle goals indicated, salvage or recycle 100 percent of the following uncontaminated packaging materials:
   a. Paper.

b. Aluminum cans.

c. Glass containers.

PART 3 EXECUTION

3.01 PLAN IMPLEMENTATION

A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

1. Comply with operation, termination, and removal requirements in Section 01 5000 - Temporary Facilities and Controls.

B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.

1. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged and recycled.

2. Comply with Section 01 5000 - Temporary Facilities and Controls, for controlling dust and dirt, environmental protection, and noise control.

3.02 RECYCLING WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

C. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.

1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

a. Inspect containers and bins for contamination and remove contaminated materials if found.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor as often as required to prevent overfilling bins.

3.03 RECYCLING CONSTRUCTION WASTE

A. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.

3.04 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged or recycled, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
   1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
   2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

END OF SECTION

SECTION 01 7700

CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 SUMMARY

A. Section includes administrative and procedural requirements for Contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.

B. Related Requirements:

1. Section 01 3233 - Photographic Documentation: For submitting Final Completion construction photographic documentation.
2. Section 01 7823 - Operation and Maintenance Data: For additional operation and maintenance manual requirements.
3. Section 01 7839 - Project Record Documents: For submitting Record Drawings, Record Specifications, and Record Product Data.
4. Section 01 7900 - Demonstration and Training: For requirements to train the Owner's maintenance personnel to adjust, operate, and maintain products, equipment, and systems.

1.02 DEFINITIONS

A. List of Incomplete Items: Contractor-prepared list of items to be completed or corrected, prepared for the Architect's use prior to Architect's inspection, to determine if the Work is substantially complete.

1.03 ACTION SUBMITTALS

A. Product Data: For each type of cleaning agent.

B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.04 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

C. Field Report: For pest-control inspection.

1.05 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items required by other Sections.

B. Comply with Owner requirements for maintenance ("attic stock") materials.

1.06 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's "punch list"), indicating the value of each item on the list and reasons why the Work is incomplete.

1. Provide the following punch lists:

a. Building Exterior.

b. Rooms.

c. Public area. Back of House areas including service corridors, maintenance, HVAC spaces, IT spaces, custodial spaces, etc.

d. Site, Civil, and Landscape areas.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction, permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

2. Submit closeout submittals specified in other Division 01 Sections, including Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.

3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.

4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.

a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Architect's signature for receipt of submittals.

5. Submit testing, adjusting, and balancing records.

6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 01 7900 - Demonstration and Training.
6. Advise Owner of changeover in utility services.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements.
10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.07 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining Final Completion, complete the following:

1. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
2. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.

3. Submit pest-control final inspection report.
4. Submit Final Completion photographic documentation.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.08 LIST OF INCOMPLETE ITEMS

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor, listed by room or space number.
2. Organize items applying to each space by major element, including categories for ceilings, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:
    a. Project name.
    b. Date.
    c. Name of Architect.
    d. Name of Contractor.
    e. Page number.
4. Submit list of incomplete items in the following format:
    a. MS Excel Electronic File: Architect will return annotated file.

1.09 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.

C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

D. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

1. Submit on digital media acceptable to Architect.

E. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 PRODUCTS

2.01 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

2. Use cleaning products that comply with one of the following. The most stringent requirement shall apply.

a. Cleaning products that comply with Green Seal's GS-37.

b. Cleaning products that comply with the the State of Louisiana maximum allowable VOC levels.

c. Cleaning products that comply with United States Environmental Protection Agency (EPA) regulations including current Clean Air Act (CAA) requirements.

PART 3 EXECUTION

3.01 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site of rubbish, waste material, litter, and other foreign substances.

b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.

c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.

d. Remove tools, construction equipment, machinery, and surplus material from Project site.

e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.

f. Remove debris and surface dust from limited-access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.

g. Clean flooring, removing debris, dirt, and staining; clean according to manufacturer's recommendations.

h. Vacuum and mop concrete.

i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.

j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.

k. Remove labels that are not permanent.

l. Wipe surfaces of mechanical and electrical equipment, and other equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.

m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.

n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.

p. Clean HVAC system in compliance with NADCA ACR. Provide written report on completion of cleaning.

q. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.

r. Clean strainers.

s. Leave Project clean and ready for occupancy.

C. Pest Control: Comply with pest control requirements in Section 01 5000 - Temporary Facilities and Controls. Prepare written report.

D. Construction Waste Disposal: Comply with waste-disposal requirements in Section 01 5000 - Temporary Facilities and Controls.

3.02 REPAIR OF THE WORK

A. Complete repair and restoration operations required by Section 01 7300 - Execution, before requesting inspection for determination of Substantial Completion.

END OF SECTION

SECTION 01 7823

OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.01 SUMMARY

A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory manuals.
2. Emergency manuals.
3. Systems and equipment operation manuals.
4. Systems and equipment maintenance manuals.
5. Product maintenance manuals.

B. Related Requirements:

1. Section 01 3300 - Submittal Procedures: For submitting copies of submittals for operation and maintenance manuals.

1.02 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.03 CLOSEOUT SUBMITTALS

A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Architect will comment on whether content of operation and maintenance submittals is acceptable.
2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Format: Submit operation and maintenance manuals in the following format:

1. Submit on digital media acceptable to Architect. Enable reviewer comments on draft submittals.

C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.

D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.

1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.

E. Comply with Section 01 7700 - Closeout Procedures, for schedule for submitting operation and maintenance documentation.

1.04 FORMAT OF OPERATION AND MAINTENANCE MANUALS

A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.

2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

1.05 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Construction Manager.
7. Name and contact information for Architect.

8. Name and contact information for Commissioning Authority.
9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
10. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.06 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY MANUAL

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals. List items and their location to facilitate ready access to desired information. Include the following:
1. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
2. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
3. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

1.07 EMERGENCY MANUALS

A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

B. Content: Organize manual into a separate section for each of the following:
1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

C. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

D. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

E. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

1.08 SYSTEMS AND EQUIPMENT OPERATION MANUALS

A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.

6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

C. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

D. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

1.09 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and

frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.

C. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
2. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
3. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
4. Identification and nomenclature of parts and components.
5. List of items recommended to be stocked as spare parts.

E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

J. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.

1. Do not use original project record documents as part of maintenance manuals.

1.10 PRODUCT MAINTENANCE MANUALS

A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.

D. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

E. Maintenance Procedures: Include manufacturer's written recommendations and the following:
   1. Inspection procedures.
   2. Types of cleaning agents to be used and methods of cleaning.
   3. List of cleaning agents and methods of cleaning detrimental to product.
   4. Schedule for routine cleaning and maintenance.
   5. Repair instructions.

F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
   1. Include procedures to follow and required notifications for warranty claims.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 7839

PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes administrative and procedural requirements for Project Record Documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.
4. Miscellaneous record submittals.

B. Related Requirements:

1. Section 01 7300 - Execution: For final property survey.
2. Section 01 7700 - Closeout Procedures: For general closeout procedures.
3. Section 01 7823 - Operation and Maintenance Data: For operation and maintenance manual requirements.

1.02 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit copies of Record Drawings as follows:
   a. Initial Submittal:
      1) Submit PDF electronic files of scanned record prints and one set of file prints.
      2) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
   b. Final Submittal: Submit PDF electronic files of scanned Record Prints and three sets of file prints.

B. Record Specifications: Submit annotated PDF electronic files and one paper copy of Project's Specifications, including addenda and Contract modifications.

C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.

1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.

E. Reports: Submit written report weekly indicating items incorporated into Project Record Documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

1.03 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation, where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.

b. Accurately record information in an acceptable drawing technique.

c. Record data as soon as possible after obtaining it.

d. Record and check the markup before enclosing concealed installations.

e. Cross-reference record prints to corresponding photographic documentation.

2. Content: Types of items requiring marking include, but are not limited to, the following:

a. Dimensional changes to Drawings.

b. Revisions to details shown on Drawings.

c. Depths of foundations.

d. Locations and depths of underground utilities.

e. Revisions to routing of piping and conduits.

f. Revisions to electrical circuitry.

g. Actual equipment locations.

h. Duct size and routing.

i. Locations of concealed internal utilities.

j. Changes made by Change Order or Construction Change Directive.

k. Changes made following Architect's written orders.

l. Details not on the original Contract Drawings.

m. Field records for variable and concealed conditions.

n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.

4. Mark record prints with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.

5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
1. Format: Annotated PDF electronic file with comment function enabled.
2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
3. Refer instances of uncertainty to Architect for resolution.

C. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Format: Annotated PDF electronic file with comment function enabled.
3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
4. Identification: As follows:
a. Project name.
b. Date.
c. Designation "PROJECT RECORD DRAWINGS."
d. Name of Architect and Construction Manager.
e. Name of Contractor.

1.04 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation, where installation varies from that indicated in Specifications, addenda, and Contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.

5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.

B. Format: Submit record specifications as annotated PDF electronic file.

1.05 RECORD PRODUCT DATA

A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and revisions to Project Record Documents as they occur; do not wait until end of Project.

B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.

3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

C. Format: Submit Record Product Data as annotated PDF electronic file.

1. Include Record Product Data directory organized by Specification Section number and title, electronically linked to each item of Record Product Data.

1.06 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as PDF electronic file.

1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

1.07 MAINTENANCE OF RECORD DOCUMENTS

A. Maintenance of Record Documents: Store Record Documents in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 7900

DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.01 SUMMARY

A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Instruction in operation and maintenance of systems, subsystems, and equipment.
2. Demonstration and training video recordings.

1.02 INFORMATIONAL SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

B. Qualification Data: For facilitator.

C. Attendance Record: For each training module, submit list of participants and length of instruction time.

D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.03 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:
   a. Name of Project.
   b. Name and address of videographer.
   c. Name of Architect.
   d. Name of Construction Manager.
   e. Name of Contractor.
   f. Date of video recording.
2. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to

corresponding training components. Include name of Project and date of video recording on each page.

3. At completion of training, submit complete training manual(s) for Owner's use prepared in same PDF file format required for operation and maintenance manuals specified in Section 01 7823 "Operation and Maintenance Data."

1.04 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.

C. Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events similar to those required.

D. Preconstruction Conference: Conduct conference at Project site to comply with requirements in Section 01 3100 "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:

1. Inspect and discuss locations and other facilities required for instruction.
2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
3. Review required content of instruction.
4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.05 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Architect.

1.06 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
    a. System, subsystem, and equipment descriptions.
    b. Performance and design criteria if Contractor is delegated design responsibility.
    c. Operating standards.
    d. Regulatory requirements.
    e. Equipment function.
    f. Operating characteristics.
    g. Limiting conditions.
    h. Performance curves.
2. Documentation: Review the following items in detail:
    a. Emergency manuals.
    b. Systems and equipment operation manuals.
    c. Systems and equipment maintenance manuals.
    d. Product maintenance manuals.
    e. Project Record Documents.
    f. Identification systems.
    g. Warranties and bonds.
    h. Maintenance service agreements and similar continuing commitments.
3. Emergencies: Include the following, as applicable:
    a. Instructions on meaning of warnings, trouble indications, and error messages.
    b. Instructions on stopping.
    c. Shutdown instructions for each type of emergency.
    d. Operating instructions for conditions outside of normal operating limits.
    e. Sequences for electric or electronic systems.
    f. Special operating instructions and procedures.
4. Operations: Include the following, as applicable:
    a. Startup procedures.
    b. Equipment or system break-in procedures.
    c. Routine and normal operating instructions.
    d. Regulation and control procedures.
    e. Control sequences.
    f. Safety procedures.

g. Instructions on stopping.
h. Normal shutdown instructions.
i. Operating procedures for emergencies.
j. Operating procedures for system, subsystem, or equipment failure.
k. Seasonal and weekend operating instructions.
l. Required sequences for electric or electronic systems.
m. Special operating instructions and procedures.

5. Adjustments: Include the following:
   a. Alignments.
   b. Checking adjustments.
   c. Noise and vibration adjustments.
   d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
   a. Diagnostic instructions.
   b. Test and inspection procedures.
7. Maintenance: Include the following:
   a. Inspection procedures.
   b. Types of cleaning agents to be used and methods of cleaning.
   c. List of cleaning agents and methods of cleaning detrimental to product.
   d. Procedures for routine cleaning.
   e. Procedures for preventive maintenance.
   f. Procedures for routine maintenance.
   g. Instruction on use of special tools.
8. Repairs: Include the following:
   a. Diagnosis instructions.
   b. Repair instructions.
   c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
   d. Instructions for identifying parts and components.
   e. Review of spare parts needed for operation and maintenance.

1.07 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 01 7823 - Operation and Maintenance Data.

B. Set up instructional equipment at instruction location.

1.08 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system. Coordinate first subparagraph below with Owner/Architect Agreement.

1. Owner will furnish Contractor with names and positions of participants.

C. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner seven days' advance notice.

D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of an oral performance-based test.

F. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

1.09 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

1. At beginning of each training module, record each chart containing learning objective and lesson outline.

B. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum sensor resolution of 12 megapixels and capable of recording in full HD mode with vibration reduction technology.

1. Submit video recordings on CD-ROM or thumb drive.

2. File Hierarchy: Organize folder structure and file locations according to Project Manual table of contents. Provide complete screen-based menu.

3. File Names: Utilize file names based on name of equipment generally described in video segment, as identified in Project specifications.

4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the equipment demonstration and training recording that describes the following for each Contractor involved on the Project, arranged according to Project Manual table of contents:

a. Name of Contractor/Installer.
b. Business address.
c. Business phone number.
d. Point of contact.
e. Email address.

C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.
1. Film training session(s) in segments not to exceed 15 minutes.
a. Produce segments to present a single significant piece of equipment per segment.
b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.

D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.
1. Furnish additional portable lighting as required.

E. Narration: Describe scenes on video recording by audio narration by microphone while and/or dubbing audio narration off-site after video recording is recorded. Include description of items being viewed.

F. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.

G. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 03 0516

UNDERSLAB VAPOR BARRIER

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Sheet vapor barrier under concrete floor slabs on grade.

1.03 REFERENCE STANDARDS

A. ASTM D 1434 - Standard Test Method for Determining Gas Permeability Characteristics of Plastic Film and Sheeting.

B. ASTM D1004 - Standard Test Method for Initial Tear Resistance of Plastic Film and Sheeting.

C. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.

D. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs

E. ASTM E 96A - Standard Test Methods for Perms of Materials.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation to discuss conformance with project requirements, manufacturer installation requirements, affected adjacent materials and system, and site conditions.

B. Attendees shall include contractor, vapor barrier installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Submit manufacturer's technical data sheets for each product to be used. Indicate compliance with specified requirements.

C. Shop Drawings: Provide detail of connection between vapor barrier and below grade waterproofing membrane. Include for all types of below grade waterproofing membrane used on project.

1. Indicate coordination with project geotechnical report recommendations. Indicate conflicts between specified minimum underslab vapor barrier requirements and geotechnical report minimum recommendations, if any.

D. Test Data: Submit report of tests showing compliance with specified requirements.

E. Manufacturer Qualifications: Submit evidence of manufacturer qualifications indicating compliance with Quality Assurance requirements of this Section.

F. Installer Qualifications: Submit evidence of installer qualifications indicating compliance with Quality Assurance requirements of this Section.

G. Photographs: Provide photographs of installation prior to permanent concealment of vapor barrier. Minimum 20 photographs in accordance with Section 01 3233 - Photographic Documentation.

1.06 CLOSEOUT SUBMITTALS

A. Special Manufacturer Warranty: Executed warranty meeting specified requirements.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum three years documented experience.

B. Installer Qualifications: Company specializing in performing the work of this Section and with at least three years of documented experience.

1.08 FIELD CONDITIONS

A. Comply with manufacturer's recommendations for temperature and conditions during and after installation.

1.09 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.

1. Warranty Period: One year from date of Substantial Completion.

B. Special Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, where items fail to perform as designed and manufactured.

1. Warranty Period: Provide manufacturer standard warranty.

PART 2 PRODUCTS

2.01 MATERIALS

A. Basis of Design: Stego Wrap 15 Mil Vapor Barrier by Stego Industries LLC. www.stegoindustries.com.

B. Acceptable Products: Subject to compliance with specified requirements.

1. FlorPrufe 120 by GCP Applied Technologies Inc. www.gcpat.com
2. Griffolyn Green 15 by Reef Industries, Inc. www.reefindustries.com
3. Moistop Ultra 15 by Henry, a Carlisle Company. www.henry.com
4. Perminator 15 mil WR Meadows, Inc. www.wrmeadows.com
5. Stego Wrap 15 Mil Vapor Barrier by Stego Industries LLC. www.stegoindustries.com.
6. VaporBlock 15 by Viaflex. www.viaflex.com
7. Viper II 15 Mil Class A Vapor Barker by ISI Building Products. www.isibp.com

C. Underslab Vapor Barrier: Minimum 15 mil thickness, nominal.

1. Water Vapor Permeance: Not more than 0.010 perms (0.6 ng/(s m2 Pa)), maximum.
2. Complying with ASTM E1745 Class A.

D. Accessory Products: Vapor barrier manufacturer's recommended tape, adhesive, mastic, boots, etc., for sealing seams and penetrations in vapor barrier.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surface over which vapor barrier is to be installed is complete and ready before proceeding with installation of vapor barrier.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 INSTALLATION

A. Install vapor barrier in accordance with manufacturer's instructions and ASTM E1643.

B. Install vapor barrier under interior slabs on grade; lap sheet over footings and seal to foundation walls.

C. Lap joints minimum 6 inches. Tape all joints with manufacturer provided seam and joint tape.

D. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Utilize premanufactured penetration boots by vapor barrier manufacturer.

E. No penetration of vapor barrier is allowed except for reinforcing steel and permanent utilities.

F. Repair damaged vapor retarder before covering with other materials.

3.03 FIELD QUALITY CONTROL

A. General: Do not place concrete prior to completion of Field Quality Control requirements indicated.

B. Manufacturer Field Technical Representative: Contractor shall engage manufacturer's qualified field technical representative during the Work to perform tests and inspections, including documenting of materials of this Section prior to concealment.

1. Contractor shall perform manufacturer recommended tests to ensure installed membrane meets manufacturer requirements. Where discrepancies exist, manufacturer technical representative shall provide field site visit to review conditions and provide written notice of compliance with requirements.

C. Third Party Inspector: Contractor shall engage a qualified testing agency to provide field testing, inspect substrate conditions, surface preparation, material application, protection, and components, and to furnish reports to Architect and materials manufacturer.

1. Photographs: Provide photographs of installation prior to permanent concealment of vapor barrier. Minimum 20 photographs in accordance with Section 01 3233 - Photographic Documentation.

D. Coordination of Inspections: Cooperate with testing and inspection entities. Allow access to work areas and staging. Notify testing agency in writing of schedule for Work of this Section to allow sufficient time for testing and inspection.

E. Notify manufacturer, third party inspectors, Owner and Architect in advance of times when access equipment and devices will be relocated. Do not relocate access equipment and devices until all parties have reasonable opportunity to make observations of work areas.

F. Reporting: Forward written inspection reports to the Architect within 10 working days of the inspection and test being performed.

G. Correction: Correct deficient applications not passing tests and inspections, make necessary repairs, and retest as required to demonstrate compliance with requirements.

H. Defects and Repairs: Contractor shall be solely responsible for repair of defective areas.

I. Repair Verification: Number and log each patch repair. Photograph work from multiple angles to adequately demonstrate extent and final result of work. Arrange for reinspection as directed by Architect.

3.04 PROTECTION

A. Protect installed materials from damage or disturbance in accordance with barrier membrane manufacturer requirements and recommendations.

B. Correct deficiencies in system prior to concrete placement.

END OF SECTION

SECTION 03 1100

CONCRETE FORMWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents:
1. Drawings and general provisions of the Subcontract apply to this Section.
2. Review these documents for coordination with additional requirements and information that apply to work under this Section.

B. Section Includes:
1. Providing formwork for concrete and shotcrete.
2. Providing construction joint waterstops.
3. Installing cast-in anchors, inserts, sleeves and similar items furnished under other Sections.

C. Related Sections:
1. Division 03 Section "Concrete Reinforcing".
2. Division 03 Section "Cast-in-place Concrete."

1.2 REFERENCES

A. General:
1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.

B. ACI – American Concrete Institute:
1. ACI 301 Specifications for Structural Concrete
2. ACI 347 Guide to Formwork for Concrete

1.3 SUBMITTALS

A. Product data for proprietary products, including forming accessories, waterstops and joint systems.

B. Schedule showing Contractor’s proposed location of construction joints not indicated on Drawings.

C. Shop Drawings: For Architectural Concrete surfaces, show form construction including jointing, reveals, pattern of form ties and other items that affect appearance of exposed surface. Indicate method of sealing forms against leakage at panel joints and form ties.

D. Samples: Only as requested by Architect's Representative.

E. Survey anchor bolts location and elevation prior to casting concrete.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

A. Form Materials: Plywood, steel, fiberglass, reinforced plastic, or any material that will produce concrete with the required finish and within the specified tolerances.
1. Use of aluminum form materials in contact with concrete is prohibited.

B. Smooth Form Finish: PS1 plywood intended for concrete formwork, edge sealed, no mill oil. Type B-B Plyform, MDO or HDO overlain plywood.
1. Where finish is exposed to view in completed construction, use only overlain plywood.

C. Foam Filler: ASTM C578; Type IX expanded polystyrene, or Type VII extruded polystyrene foam.

2.2 ACCESSORIES

A. Form Ties: Snap off metal tie of fixed length with plastic cone, designed to prevent spalling of concrete upon removal. Provide units that will leave no metal within 1-inch (25 mm) of concrete surface.

B. Form Release Agent: Water-based, colorless, nonstaining, chemically active agent that shall not impair bonding of paint or other coatings intended for use. Formulated for use on form facing material.
1. Lumber, plywood or MDO overlain plywood: Aqua-Nox F by Nox-crete, or approved equal.
2. HDO overlain plywood, steel or fiberglass: Nox-crete PCE by nox-crete, or approved equal.

C. Expansion Joint Filler: Preformed asphalt impregnated fiber, ASTM D1751, 1/2 inch thick, unless otherwise noted.

PART 3 - EXECUTION

3.1 CONSTRUCTION OF FORMS

A. Design, construct and maintain formwork in accordance with ACI 347.

B. Provide positive means of adjustment, such as wedges and jacks, or shores and struts. Adjust formwork before and during concrete placement to achieve the specified tolerances.

C. Tolerances: Finished work shall conform to tolerances of ACI 117.E.
   1. Tolerance for offsets at panel edges in as-cast condition shall conform to ACI 117, Class A for Architectural Concrete, Class B for other surfaces exposed to view, and Class C for all other surfaces.

D. Construct forms mortar-tight and in a manner to permit removal without damaging the concrete.

E. Verify that sleeves and other openings, offsets, recesses, channel chases, anchors, ties and inserts are in place before concrete is placed.

F. Earth Forms: Footing forms may be omitted and foundation concrete may be placed directly into neatly and accurately cut excavations, provided the excavation walls are stable, a minimum of one inch and maximum of three inches outside the concrete edges indicated on the drawings.
   1. Where sides are unstable or excavations are not accurately cut to tolerances of ACI 301, construct formwork to the extent required, at no additional cost to Owner.
   2. Hand trim sides and bottom of earth forms; remove loose dirt prior to placing concrete.

G. Provide temporary openings in formwork at the base of wall and column forms to allow inspection and cleaning before concrete placement.

H. Provide blockouts for mechanical and electrical work wherever necessary, even though not shown on the Drawings.

I. Provide 3/4-inch (19 mm) chamfers for external corners.

J. Plywood Forms at Exposed Surfaces:
   1. Keep number of panel joints to practical minimum.
   2. Ensure vertical joints are plumb and horizontal joints are level.
   3. Align form ties vertically and horizontally.

K. Formwork for Architectural Concrete surfaces:
   1. Conform to requirements of Architectural Concrete section of ACI 301.
   2. Limit deflection of form facing materials between studs, as well as deflection of studs and walers to 0.0025 times the clear span (L/400).
   3. Arrange joints in facing material in geometric pattern as approved by the Architect.
   4. Locate form ties in symmetric pattern within panels as shown or as approved by Architect. Use ties specified for Architectural Concrete. Provide "dummy" cones where required to match pattern shown.
   5. Form inside corners so that no concrete is placed against panel edges.
   6. Seal panel joints and penetrations with gaskets and/or sealant to make watertight.

L. Shoring: Shores and struts shall be provided with positive means of adjustment and settlement shall be taken up during construction.

M. Form Release Agent: Apply a coating of form release agent immediately before use, but prior to installation of reinforcing steel and embedded items.

N. Construction Joints:
1. Provide where shown or noted on the Drawings or as approved by the Architect.
2. Provide key indentations at formed joints.
3. Prevent formation of shoulders and ledges.

O. Waterstops: Install in construction joints where shown or noted on Drawings. Install in accordance with manufacturer's written instructions, including location, surface preparation, adhesive primer, and butting or lapping of ends.

P. Expansion Joints: Provide expansion joints and isolation joints where shown or noted on Drawings. Place joint filler in straight line with edge held back 1/8 inch (3 mm) from concrete surface and secured to formwork or previously placed construction.
1. Hold edge back by width of joint where joints are scheduled to receive sealant.

3.2 REMOVAL OF FORMWORK

A. Do not remove forms until concrete has hardened and attained sufficient strength to permit safe removal and adequate support of inherent and imposed loads. It shall be the Contractor’s responsibility to limit construction loads to those which can be carried safely by the developed strength of the structure at the time of loading and by formwork and shoring in-place at the time of loading.

B. Remove forms carefully to avoid damaging corners and edges of exposed concrete. Prying against the face of concrete shall not be allowed.

C. After concrete is placed, forms and shores shall remain in place for not less than the following period of time, subject to requirements for additional curing:
1. Columns: 24 hours, unless otherwise noted.
2. Walls: 2 days, unless otherwise noted. 7 days for Architectural Concrete and other concrete surfaces exposed at building exterior.
3. Beams Sides: 2 days, unless otherwise noted.
4. Beam Soffits: Maintain formwork 7 days; shore until concrete achieves design compressive strength, 7 days minimum.
5. One-Way Slab Soffits: Maintain formwork 7 days; shore until concrete achieves design compressive strength, 7 days minimum.
6. Flat Slabs: Maintain form facing material 7 days; shore until concrete achieves design compressive strength, 21 days minimum.
    a. Upon removal of form facing material, install reshores as soon as practical, but not longer than 4 hours after stripping.

D. Where concrete placing continues on upper levels, shoring may be required to be in place longer than minimum time noted for purpose of supporting weight of floor or roof pours above.

E. Where forms are removed in less than 7 days, curing shall be continued as follows:
   1. Immediately following form removal thoroughly wet surface.
   2. Continue curing in accordance with provisions of Division 03 Section "Cast-in-Place Concrete".

F. Reuse of Forms: Forms may be reused provided they are straight, clean, free from nails, dirt, hardened concrete, rust, and other injurious matter and edges and surfaces are in good condition.
   1. Clean and repair damage caused by placing, removal, or storage. Reuse of formwork that would reduce quality of exposed-to-view concrete will not be permitted.
   2. Forms shall not be reused for Architectural Concrete if there is evidence of surface wear or defect that would impair the quality of the surface.

END OF SECTION

SECTION 03 2000

CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents:

1. Drawings and general provisions of the Contract apply to this Section.
2. Review these documents for coordination with additional requirements and information that apply to work under this Section.

B. Section Includes: Concrete reinforcement and accessories.

1.2 REFERENCES

A. General:

1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.

B. ACI – American Concrete Institute:

1. ACI 117 Tolerances for Concrete Construction
2. ACI 301 Specifications for Structural Concrete
3. ACI 315 Standard Practice for Detailing Reinforced Concrete Structures

C. ASTM International:

1. ASTM A1064 Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
2. ASTM A615 Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
3. ASTM A706 Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
4. ASTM A970 Standard Specification for Headed Steel Bars for Concrete Reinforcement

D. CRSI – Manual of Standard Practice.

E. ICBO - Evaluation Reports.

1.3 SUBMITTALS

A. Submit under provisions of Division 01 Section "General Requirements."

B. Shop Drawings: Prepare placing drawings in accordance with ACI 315. Show size, shape and location of bars and wire fabric in structure. Show splice locations and lengths. Where details are not shown, conform to standards of practice indicated in ACI 315 and submit for approval.

1. Bill reinforcing bars for walls on elevations. Bill reinforcing bars for slabs on plans. Plans and elevations need not be true views. When more than one wall or slab are identical, only one such wall or slab is required. Take sections to clarify the arrangement of reinforcement. Identify, but do not bill bars on sections.
2. Unless the location of reinforcing is clear, give dimensions to some structural feature that will be readily distinguishable at time bars are placed.
3. Make placing drawings complete, including the location of support bars and chairs, without reference to the design drawings.

C. Submit data required to evaluate proposed mechanical splices.

D. Submit manufacturer's certified mill test reports on each heat of reinforcing steel delivered, showing physical and chemical analysis before placing reinforcement.

1.4 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of ACI 301 CRSI's "Manual of Standard Practice", except where more stringent requirements are shown or specified.

B. Requirements of Regulatory Agencies: Proprietary products, including bar couplers, shall have an active ICBO Evaluation Report.

C. Material Quality Assurance: Mill test reports including chemical analysis, tensile properties and bend test shall be examined for all reinforcing.

D. Maintain positive identification of reinforcing by heat number. Provide certified mill test reports to Testing Laboratory.

E. Where positive identification cannot be made and procedures are not deemed adequate to ensure compliance, Testing Laboratory will randomly sample and make one tensile and one bend test from each 2-1/2 tons or fraction thereof of each size of reinforcement. Contractor will bear the cost of testing.

PART 2 - PRODUCTS

2.1 REINFORCING MATERIALS

A. Bar Reinforcement: ASTM A615, Grade 60, deformed carbon bars.

1. ASTM A706, only where noted on Drawings.

B. Headed Bar Reinforcement: ASTM A970.

C. Spirals: ASTM A1064.

D. Welded Wire Fabric: ASTM A1064.

E. Smooth Dowels, ASTM A615, Grade 60, smooth; sawcut or grind one end to remove offsets; shop paint with iron oxide zinc chromate primer.

F. Mechanical Bar Couplers: Provide mechanical couplers with a current ICC evaluation report. Coupler shall develop 160% percent of specified minimum yield strength of spliced reinforcement.

2.2 ACCESSORIES

A. Tie Wire: Minimum 16-gage black annealed wire.

B. Bar Supports:

1. At surfaces not exposed to view in completed structure: Precast concrete bar supports with two 16 ga. embedded wires or CRSI Class 2 wire supports.
2. Supports placed against ground or on top of vapor barrier: Precast concrete blocks not less than 3 inches square (1935 mm^2) with two 16 ga embedded wires.
3. At Architectural Concrete and surfaces exposed to weather: CRSI Class 2 stainless steel or CRSI Class 1 plastic protected.
4. Where support is no closer to concrete surface than 1/2 inch (13 mm): CRSI Class 3 wire supports.

2.3 FABRICATION

A. Fabricate reinforcement in accordance with ACI 315 where specific details are not shown.

PART 3 - EXECUTION

3.1 PLACEMENT

A. Surface Condition of Reinforcement: Before placing concrete, clean reinforcement of loose scale, dirt, grease and other substances which would impair bond with concrete.

B. Place reinforcement in accordance with the Drawings and the CRSI Manual.

1. Steel bars shall be of size and length indicated, accurately bent or formed to shapes detailed or scheduled by experienced shops by methods that will not injure the materials. Reinforcing bars shall be shop fabricated to lengths and bends shown on the

drawings. Fabrication tolerance shall be in accordance with the requirements of ACI 315.

2. Reinforcing bars shall be as long as possible with a minimum number of joints.
3. Steel reinforcement shall not be bent or straightened in a manner that will injure the material or the embedding concrete. Bars with kinks or bends not shown on the Drawings shall not be used. Heating of reinforcement for bending will not be permitted.
4. Reinforcement shall be tagged with suitable identification to facilitate sorting and placing.

C. Place reinforcing bars accurately as to spacing and clearance and securely tied at intersections and supports with wire and in such a manner as will preclude displacement during pouring of concrete. Placing tolerances shall be in conformance with the requirements of ACI 117.

D. Place and secure reinforcement to maintain the proper distance and clearance between parallel bars and from the forms. Provide vertical steel with metal spreaders to maintain steel properly centered in the forms. Horizontal reinforcement shall be supported at proper height on concrete pads, chairs or transverse steel bars.

E. After placing, maintain bars in a clean condition until completely embedded in concrete.

F. Bars shall not be spaced closer than 1-1/2 diameters of the largest of two adjacent bars, 1-1/2 times the maximum aggregate size, nor one inch, except at bar laps. Where reinforcement in members is placed in two layers, the clear distance between layers shall be not less than one inch (25 mm) or more than 1-1/2 inches (13 mm) unless otherwise noted on the drawings. The bars in the upper layer shall be placed directly above those in the bottom layer unless otherwise detailed.

G. Coverage of bars shall be as shown and scheduled. Conform to ACI 301 where not indicated.

H. Where obstruction prevents the intended placement of reinforcement, provide additional reinforcement as directed by the Architect around the obstruction.

I. Splice bars as indicated by lapping and securely wiring together. Splices at locations other than those indicated are subject to the approval of the Architect. Splices of reinforcement shall not be made at the point of maximum stress. Splices shall provide sufficient lap to transfer the stress between bars by bond and shear. Bars shall be spread the minimum distance specified. Stagger splices of adjacent bars where possible.

J. Reinforcing bars shall not have welded joints.

K. Mechanical Bar Couplers: Install in accordance with applicable ICC evaluation report. Maintain clearance and coverage at coupler. Stagger couplers wherever practical.

3.2 FIELD INSPECTION

A. Architect will:

1. Review Quality Assurance procedures for maintaining identification of steel. Collect certificates of compliance and test reports for reinforcing steel.
2. Periodic visually inspection of placement of reinforcement for conformance with the Contract Documents and as required by IBC Chapter 17.

END OF SECTION

SECTION 03 3000

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents:

1. Drawings and general provisions of the Subcontract apply to this Section.
2. Review these documents for coordination with additional requirements and information that apply to work under this Section.

B. Section Includes

1. Concrete reinforcement.
2. Cast-in-place concrete.

C. Related Sections:

1. Section 03 10 00 - Formwork
2. Section 03 20 00 - Concrete Reinforcement

1.2 REFERENCES

A. General:

1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.

B. American Concrete Institute (ACI):

1. ACI 211.1 Proportions for Normal, Heavyweight and Mass Concrete
2. ACI 301 Specifications for Structural Concrete
3. ACI 303R Guide to Cast-In-Place Architectural Concrete Practice
4. ACI 305.1 Specification for Hot Weather Concreting
5. ACI 306.1 Standard Specification for Cold Weather Concreting
6. ACI 308.1 Specification for Curing Concrete
7. ACI 309 Consolidation of Concrete
8. ACI 318 Building Code Requirements for Structural Concrete

C. ASTM International:

1. ASTM A615 Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
2. ASTM A1064 Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
3. ASTM C31 Making and Curing Concrete Test Specimens in the Field
4. ASTM C33 Concrete Aggregates
5. ASTM C94 Ready Mix Concrete
6. ASTM C143 Test Method for Slump of Portland Cement Concrete
7. ASTM C150 Portland Cement
8. ASTM C156 Test Method for Water Retention by Concrete Curing Materials
9. ASTM C1602 Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
10. ASTM C171 Sheet Materials for Curing Concrete
11. ASTM C172 Sampling of Freshly Mixed Concrete
12. ASTM C260 Air Entraining Admixtures for Concrete
13. ASTM C309 Liquid Membrane - Forming Compounds for Curing Concrete
14. ASTM C138Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
15. ASTM C330 Lightweight Aggregates for Structural Concrete
16. ASTM C494 Chemical Admixtures for Concrete
17. ASTM C567 Test Method for Unit Weight of Structural Lightweight Concrete
18. ASTM C618 Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
19. ASTM C881 Epoxy - Resin - Base Bonding Systems for Concrete
20. ASTM E1745 Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs

D. American Association of State Highway and Transportation Officials (AASHTO):

1. M182-60 - Burlap Cloth Made for Jute or Kelat.

E. American Institute of Steel Construction (AISC) Code of Standard Practice

1.3 SUBMITTALS

A. Mix design for each concrete mix sealed by a professional engineer or record of verification by trial mixtures or historical data in accordance with ACI 318 and Section 1.05 Quality Assurance

1. Include compression test data used to establish mix proportions.

B. Submit certification that all facilities of the ready-mix plant comply with the requirements of ASTM C94.

C. Material Certificates.

1. Cementitious materials, including fly ash.
2. Aggregates, including gradation and combined gradation.
3. Admixtures. Where more than one admixture is proposed, include statement from admixture manufacturer indicating that admixtures proposed for use are compatible, such that desirable effects of each admixture will be realized.

D. Product Data: Provide data form proprietary materials, including admixtures curing materials, and finish materials.

E. Submit ticket to Testing Laboratory for each batch of concrete delivered, bearing the following information. Refer to "Field Quality Control" Article of this Section.

F. Mix identification.

G. Weights of cementitious materials, aggregates, water and admixtures, and aggregate size.

H. Samples: As requested by Testing Laboratory.

I. Submit placement drawings, showing location of construction joints, if the location of construction joints will be different than shown on the construction drawings.

J. Submit test reports from the independent testing agency for review by the Architect.

1.4 QUALITY ASSURANCE

A. Standards: Comply with provisions of ACI 301, except where more stringent requirements are shown or specified. Evaluation and acceptance of concrete structures will be in accordance with ACI 301.

B. Concrete Mix Design: Testing laboratory shall, under direction of its registered Civil Engineer, design concrete mixes. Each mix shall bear the signature, seal and registration expiration date of the engineer directing the design work. For mixes containing greater than twenty five percent fly ash, the Testing laboratory shall produce calculations and test batches in accordance with the recommendations of ACI 211.1 to determine the minimum water content and to confirm workability, curing time and compressive strength.

C. Certificates of Compliance: Acceptability of the following materials will be based upon documentation furnished by the manufacturer identifying each batch of material and certifying compliance with the requirements specified:

1. Portland cement.
2. Fly ash.
3. Chemical admixtures.

D. Certified laboratory test reports: Before delivery of materials, certified copies of the reports of all tests required in referenced publications or otherwise specified here shall be submitted. The testing shall have been performed by an independent laboratory approved by the

Architect within one year of submittal of test reports for approval. Test reports on a previously tested material shall be accompanied by notarized certificates from the manufacturer certifying that the previously tested material is of the same type, quality, manufacture and make as that proposed for use in this project. Certified test reports are required for the following:

1. Portland Cement.
2. Aggregates.
3. Admixtures.

E. Survey anchor bolts for placement and alignment prior to casting concrete.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

A. See Section 03 10 00 – Concrete Formwork

2.2 REINFORCING STEEL

A. Reinforcing Steel: ASTM A615 (unless otherwise noted on the drawings), of the yield grade specified on the drawings; deformed plain carbon steel bars.

1. Recycled content shall be a minimum of 75% recycled post-consumer steel.

B. Welded Wire Reinforcement: ASTM A1064.

C. See Section 03 20 00 – Concrete Reinforcement

2.3 CONCRETE MATERIALS

A. Cement: Type 1 ASTM C150, normal-weight unless noted otherwise.

1. Cement for lightweight concrete shall conform to ASTM C330.

B. Cementitious materials and aggregates for exposed concrete shall be from same source throughout the work.

C. Cementitious Material: An intimate blend of Portland cement and fly ash.

1. Portland Cement: ASTM C150, Type II, low alkali.
2. Fly Ash: ASTM C618, Class F with the following Modified ASTM requirements:

a. Loss of Ignition (L.O.I.): maximum 1%.
b. Sulfur Trioxide (SO_3) shall not exceed 3% by weight.
c. Water requirement maximum: 100% control.
d. $R=(CaO-5\%)/(Fe_2O_3)$, where R (sulfate resistance) is 0.75 maximum and CaO/Fe_2O_3 is the percentage from fly ash oxide analysis.

D. Aggregate for Standard Weight Concrete: ASTM C33.

1. Maximum size aggregate shall be 1-1/2” long for footings and ¾” for wall and slabs.

E. Aggregate for Lightweight Concrete: ASTM C330. Lightweight aggregate shall be vacuum saturated expanded shale or clay produced by rotary kiln.

F. Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete: ASTM C1602.

G. Admixtures:

1. General:

a. Where mix contains more than one admixture, all admixtures shall be supplied by one manufacturer. Manufacturer shall certify that admixtures are compatible such that desirable effects of each admixture will be realized.

b. Liquid admixtures shall be considered part of the total water.

H. Waterproofing Admixture:

1. The concrete waterproofing admixture shall be of the cementitious crystalline type that chemically controls and permanently fixes a non-soluble crystalline structure throughout the capillary voids of the concrete.
2. The design shall include the use of the crystalline waterproofing repair materials that generate a non-soluble crystalline formation in the concrete.
3. The concrete crystalline waterproofing admixture shall be specifically formulated as a concrete admixture.
4. Xypex Admix C-1000.
5. The dosage rate for the Xypex Admix C-1000 shall be 3% by weight of cement.
6. Crack Bridging Capability: Requirement: Crystalline Waterproofing shall be capable of
7. sealing static cracks up to 1/64”.

I. Lightweight Concrete shall contain an air entrainment admixture conforming to ASTM C260, to produce an air content of 3 to 5 percent at point of placement.

J. Water Reducing Admixture: ASTM C494, Type A. Provide in all concrete at necessary dosage to facilitate placement.

K. Mid to High Range Water Reducing Admixture: ASTM C494, Type F; polycarboxylate formulation. Provide in mid-range or high-range dosage as necessary for placement at the maximum water to cement ratio specified.

L. Set Accelerating Admixture: ASTM C494, Type E, non-chloride. Subject to approval of Architect's Representative, provide in necessary dosage to accelerate set.

M. Set Retarding Admixture: ASTM C494, Type D. Subject to approval of Architect's Representative, provide in necessary dosage to retard set.

N. Color Admixtures: ASTM C579.

2.4 ACCESSORIES

A. Curing Compounds: ASTM C309, which will not discolor concrete or affect bonding of other finishes applied thereover, and which restricts loss of water to not more than 0.500 grams per square centimeter of surface when tested per ASTM C156, “Test Method for Water Retention by Concrete Curing Materials.”

1. Type 1 Clear, Liquid membrane-forming compound, Class A Unrestricted

B. Slab Curing Membrane: Membrane conforming to ASTM C171, non-staining.

C. Burlap Sheet: AASHTO M182, class 3 or 4.

D. Surface Hardener: Lapidolith, Hornolith, Kemi-Kal Liquid or equal.

E. Rock Base: Clean, hard and durable gravel or crushed rock.

F. Vapor Barrier: Polyethylene sheet not less than 10 mils thick that is resistant to deterioration when tested according to ASTM E 154

1. Lap 12” to accommodate pouring direction

G. Sand Cover: See Section 31 23 23 Select Fill and Backfill

1. Note native, uncompacted soil is acceptable backfill for pile-supported slabs.
2. “Dry bottom” slabs for pile cap or grade beam formation shall be Select Fill. Inclusion of dry bottoms are at the discretion of the Contractor.

H. Geofoam or Closed Cell Extruded Polystrene (EPS): ASTM D6817, nominal density = 15psi, basis of design = EPS15 w termicide.

I. Expansion Joint Filler: non-extruded premolded material composed of fiberboard impregnated with asphalt conforming to the requirements of ASTM D1751

J. Waterstops: Waterstop-RX Volclay waterproofing by American Colloid Company or approved equal unless noted otherwise.

2.5 CONCRETE MIXES

A. Aggregate: Coarse aggregate size number in accordance with ASTM C33 for normal-weight aggregate. Coarse aggregate size in accordance with ASTM C330 for lightweight aggregates. Maximum size aggregate = 3/4 inch.

B. Slump: 5” maximum slump at point of placement in inches when tested in accordance with ASTM C143.

C. Strength: Minimum compressive strength in psi per Design Drawings, tested in accordance with ASTM C39.

D. Air Content: Max 6%

E. Pozzolan maximum content by percentage of cementitious material by weight.

1. Fly Ash: Maximum 25%
2. Calcined Pozzolan Content: Maximum 10%
3. Silica Fume: Maximum 5%

F. Water to Cementitious Material Ratio: Water-to-cementitious-material ratio not exceeding 0.45 by weight. Weight of water shall include all free moisture, including liquid admixtures. Mixes shall contain specified high range water reducing admixture at mid-range dosage as required to achieve specified slump.

G. Lightweight Concrete: Equilibrium weight (at 100 days air dry) of 113 pcf plus or minus 3 pcf, ASTM C567. Mix shall contain 4 percent, plus or minus 1 percent, entrained air by volume at point of placement.

H. Proposed mixes shall produce concrete to strengths specified with adequate workability and proper consistency to permit concrete to be worked into forms and around reinforcement without excessive segregation or bleeding.

I. Mix design shall be subject to review by the Architect's Representative and the Testing Laboratory. Mixes shall be submitted in ample time for review and adjustment, if necessary.

J. Add air entraining agent to normal weight concrete mix for work exposed to exterior.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify site conditions under provisions of Division 01 Section "General Requirements".

B. Verify requirements for concrete cover over reinforcement.

C. Verify that anchor bolts, embedded plates, reinforcement, sleeves and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

3.2 FORMWORK ERECTION

A. Verify lines, levels, and measurement before proceeding with formwork.

B. Hand trim sides and bottom of earth forms; remove loose dirt.

C. Align form joints.

D. Do not apply form release agent to concrete surfaces which receive special finishes that may be affected by agent.

E. Coordinate work of other sections in forming and setting openings, slots, recesses, chases, sleeves, bolts, anchors, and other inserts.

3.3 REINFORCEMENT & EMBEDDED ITEMS

A. Place, support, and secure reinforcement and embedded items against displacement.

B. Installation tolerances for anchor bolts for structural steel columns shall comply with the AISC Code of Standard Practice tolerances.

C. Only items that are dimensionally located on the drawings may be embedded in concrete regardless of the trade responsible for placing them.

D. Provide lap splices, standard hooks, and corner bars as indicated on the Drawings

E. Provide suitable wire spacers, chairs, ties, brickettes etc. for supporting reinforcing steel in the proper position while placing concrete. Do not "wet stick" dowels.

F. Locations and sizes of openings, sleeves, etc. required for other trades must be verified by these trades before placing concrete.

G. All slots, sleeves, trenches, and other embedded items shall be set and secured against movement before the concrete is placed. See Architectural, Electrical, Mechanical, Plumbing, and Vendor drawings for sizes and locations.

H. Conduits and pipes embedded in concrete slabs may be no larger than 1/3 of the slab thickness (based on the maximum outside diameter) and shall have a center-to-center spacing no less than three (3) conduit diameters. Regardless of diameter, the minimum clear spacing between conduits or reinforcing shall be one (1) inch.

I. No aluminum conduits, devices, or fixtures may be embedded into the concrete so that the aluminum is in direct contact with the concrete.

J. No conduits shall be placed in slabs within 12 inches of column face or face of bearing wall.

3.4 PLACING CONCRETE

A. Notify the Architect at least 48 hours prior to commencement of concreting operations. No concrete shall be placed until all subgrade, formwork, reinforcing steel, embedded items and surfaces against which concrete is to be placed have been accepted by the Architect. The rate of delivery, haul time, missing time and hopper capacity shall be such that all mixed concrete

delivered shall be placed in forms within 90 minutes from the time of the introduction of cement and water into the mixer. No water shall be added after transit mixer leaves the batching plant without the approval of the Architect.

B. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instruction.

C. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with epoxy grout.

D. Foundation surfaces against which concrete is to be placed must be free from standing water, mud and debris. Surfaces shall be clean and free from oil, objectionable coatings, and loose or unsound material.

E. All surfaces of forms and embedded items shall be free of grout before placing concrete.

F. Location of construction joints shall be as shown on the structural drawings.

G. When ambient temperature is expected to exceed 80°F during placing or finishing operations, steps shall be taken in accordance with ACI 305, "Recommended Practices for Hot Weather Concreting", to reduce concrete temperature and water evaporation by proper attention to the ingredients, production methods, handling, placing, protection and curing. The Contractor shall submit a detailed hot weather concreting procedure to the A/E for approval at least two business days before concrete placement is planned. The Contractor's testing agency will produce trial batches in accordance with ACI 305. Slabs will be fog sprayed from the completion of skreeding until curing is begun; the fog spray may be discontinued on sections during troweling.

H. When ambient temperature is expected to be below 40□F during placing or finishing operations, steps shall be taken in accordance with ACI 306, "Recommended Practices for Cold Weather Concreting".

3.5 FLOOR SLABS

A. Place floor slabs as indicated on Drawings. Saw cut control joints at an optimum time after finishing. Cut slabs with a 3/16-inch thick blade to 1 inch depth.

B. Separate slabs on grade from vertical surfaces with joint filler. Extend joint filler from bottom of slab to within ¼ inch of finished slab surface.

C. Finish surfaces as scheduled.

D. Install joint devices and joint device anchors in accordance with manufacturer's instructions. Maintain correct position to allow joint cover flush with floor finish.

E. Construct slab on grade and shored elevated floor slabs with overall specified FF25/FL20 and with minimum FF20/FL15 for individual floor sections in accordance with ACI 302.1.

Determination of FF/FL numbers will be in accordance with ASTM E 1155. The Contractor will take remedial measures when floor slabs do not meet specified requirements. The Contractor's plan for remedial measures shall be submitted to the Architect for review and approval.

F. Where control joints are required, saw cuts shall be made as soon as the concrete can support the saw without damaging the surface. Maximum (8) hours after the start of concrete pout.

3.6 CURING AND PROTECTION

A. Wheeling, working and walking on concrete shall be avoided for at least 24 hours after casting. Protect concrete from sun and rain. Do not permit concrete to become dry during curing period. Concrete shall not be subjected to any loads until concrete is completely cured, and until concrete has attained its 28-day strength.

B. Protect concrete during and after curing from damage during subsequent building construction operations.

C. Cover traffic areas with plywood or other suitable means for as long as necessary to protect concrete from damage.

D. Concrete may be cured with the application of a curing blanket as described below or the use of a curing compound following the requirements of Section 2.04 or another alternative curing plan requested by the Contractor. It is the responsibility of the Contractor to adequately cure the concrete and the curing mechanism is their discretion. EOR is not responsible for non-structural shrinkage cracking that may occur with inadequate curing practices or with the substitution of a curing compound in lieu of curing blankets.

E. Specific curing requirements for slabs shall include the following unless Contractor elects to submit an alternative plan: Immediately upon completion of finishing operation, the surface of slabs shall be sealed against moisture loss by the application of a curing blanket made of polyetheylene bonded to burlap in accordance with the manufacturer's instructions. Alternatively, waterproof curing paper may be used with edges lapped and sealed with tape. The curing membrane shall be weighted down. Tears and rips in curing membrane shall be repaired immediately during curing period. Curing shall be maintained for 7 days.

F. Specific curing requirements for walls, beams and columns shall include the following unless Contractor elects to submit an alternative plan: Concrete in forms shall be kept moist until removal. Immediately upon removal of forms, an approved sprayed-on curing compound shall be applied to the concrete surfaces in strict compliance with the manufacturer's recommendations. Curing shall be maintained for 7 days.

G. For above grade concrete sections over three feet thick except lean concrete (if required):

1. Ten days before placing concrete, the results of a thermal test performed by the Contractor will be submitted to the Architect for approval. Thermal tests shall consist of a three-foot test cube of the design mix for the thick section instrumented with

thermocouples by the Contractor's testing agency and monitored to determine whether the heat of hydration exceeds 150°F. If the temperature exceeds 150°F, the mix design will be revised or standard aggregate cooling utilized and a second test cube cast and tested at no additional cost to the Architect.

2. The temperature gradient between the center and the surface of the section must not exceed 20°F during the first ten days of the controlled curing period. Thermocouples shall be installed by the Contractor's testing agency in the center and six inches from the surface at twenty-foot intervals and at the corners. The thermocouples are to be monitored continuously by the Contractor's testing agency and, if the temperature gradient exceeds 20°F, insulating blankets shall be placed over the surface. On surfaces with protruding reinforcing, such as the top of a wall, loose insulation will be used.

3.7 FIELD QUALITY CONTROL

A. Testing Agency: Owner or Contractor will engage a qualified testing agency to perform material tests and inspections.

B. Tests: Perform according to ACI 301.

1. Definition of (1) set: minimum (3) cylinders for testing at (7) days, (3) cylinders for testing at (28) days, and additional (3) cylinders for reserve. Sample in accordance with ASTM C172.
2. Testing Frequency: Obtain at least (1) set of cylinders for each 100 cubic yd. or fraction thereof of each concrete mixture placed each day. Minimum (1) set of cylinders per day of concrete placement.
3. Samples shall be properly cured and stored. Prepare cylinders in accordance with ASTM C31.
4. Test concrete cylinders in accordance with ASTM C39 by a qualified Testing Agency and submit results to Architect for review within (3) days.
5. Testing Agency will provide slump tests per ASTM C143 air content testing per ASTM C231 or C173, temperature by ASTM C1064, density by ASTM C138 in the field for each set of cylinders or minimum (1) test each per day of concrete placement. Results shall be submitted to the Architect for review within (3) days.

C. Visual inspection by the EOR does not guarantee the Contractor's work or alleviate the Contractor from final responsibility to place reinforcement and concrete in accordance with the Contract Drawings and Specifications.

END OF SECTION

SECTION 04 0511

MORTAR AND MASONRY GROUT

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCUDES

A. Mortar and grout for masonry applications.

B. For joint reinforcements and anchoring, refer to individual masonry unit, or masonry veneer specification Sections.

C. Coordinate with project Structural requirements.

1.03 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Provide written manufacturer data that submitted products meet or exceed specified requirements.

1. Include design mix and indicate whether the Proportion or Property specification of ASTM C270 is to be used. Also include required environmental conditions and admixture limitations.

a. Reports: Submit reports on mortar indicating compliance of mortar to property requirements of ASTM C270 and test and evaluation reports per ASTM C780.

b. Reports: Submit reports on grout indicating compliance of component grout materials to requirements of ASTM C476 and test and evaluation reports to requirements of ASTM C1019.

2. Cementitious Material Manufacturer Data: Include name of manufacturer, brand name, and type.

a. Mortar admixtures.

b. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.

c. Grout mixes. Include description of type and proportions of ingredients.

C. Samples for Selection - Permanently Exposed Mortar: Submit manufacturer color charts illustrating available mortar color, and color range.

D. Samples for Verification - Permanently Exposed Mortar: Submit two samples of each selected mortar, illustrating mortar color, and color range.

1. Include with each sample a list of ingredients with proportions of each. Identify sources, both supplier and quarry, of each type of sand and brand names of cementitious materials and pigments, if any.

1.04 QUALITY ASSURANCE

A. For each type and color of cement specified, only one brand shall be used throughout project.

B. Comply with provisions of TMS 402/602, except where exceeded by requirements of the contract documents.

C. Refer to sample panel and mock-up requirements of masonry sections.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer recommendations and instructions.

B. Deliver materials, except aggregate, in original unopened containers displaying product name, type, grade and mixing instructions.

C. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

1.06 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.

1. Warranty Period: One year from date of Substantial Completion.

B. Special Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, where items fail to perform as designed and manufactured.

1. Warranty Period: Provide manufacturer standard warranty.

PART 2 PRODUCTS

2.01 MORTAR AND GROUT FOR MASONRY, GENERAL

A. Source Limitations:

1. Obtain permanently exposed cementitious materials from single manufacturer. Provide materials of consistent quality in appearance and physical properties.

B. Mortar and Grout Color:

1. Permanently Exposed Grout and Mortar:

a. Color: As selected by Architect from manufacturer full range.

2. Permanently Concealed Grout and Mortar: Includes grout and mortar in CMU assemblies indicated for field painting.

a. Manufacturer standard natural light gray, unless otherwise indicated. Submit sample for Architect approval.

2.02 MORTAR AND GROUT MIXES FOR MASONRY, GENERAL

A. Applications: General mix requirements apply to all project mortar and grout locations. Provide premixed, prepackaged mortar and grout and permanently exposed locations.

B. Mortar Mix Designs: ASTM C270, Property Specification.

1. For load bearing masonry applications, refer to project structural Drawings and Specifications.

2. Characteristics:

a. ASTM C270, Type S, minimum 1800 psi compressive strength.

b. ASTM C270, Type M, minimum 2500 psi compressive strength.

3. Mortar Types by Application Location:

a. Masonry below grade and in contact with earth: Type M.

b. CMU Masonry, above grade, in all locations: Type S.

C. Grout Mix Designs:

1. 3,000 psi (21 MPa) strength at 28 days; 8-10 inches (200-250 mm) slump; mix in accordance with ASTM C476.

a. Fine grout for spaces with smallest horizontal dimension of 2 inches (50 mm) or less.

b. Coarse grout for spaces with smallest horizontal dimension greater than 2 inches (50 mm).

2.03 PREMIXED, PREPACKAGED MORTAR AND GROUT MIXES FOR MASONRY

A. Applications: Provide premixed, prepackaged mortar and grout at permanently exposed locations.

B. Masonry Mortar/Masonry Cement: Premixed, precolored, prepackaged dry material complying with ASTM C91 and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water and sand only in accordance with ASTM C144.

1. Type: As indicated in this Section.

2. Characteristics:

a. Non-staining, 19 percent maximum air content by volume, with inert, alkali-resistant, fade-resistant mineral pigments.

b. Containing integral water-reducing and plasticizing admixtures, proportioned to comply with requirements of ASTM C270.

3. Acceptable Products: Subject to compliance with requirements.

a. Argos Eaglebond Custom Color Masonry Cement.

b. Cemex S.A.B. de C.V.; Richcolor Masonry Cement.

c. Lehigh, a Heidelberg Cement Group Brand, Flamingo Custom Color Masonry Cement.

d. LaFarge-Holcim; Holcim Mortamix Rainbow Custom Colored Masonry Cement.

C. Masonry Grout - Packaged Dry Material for Mixing: Premixed cementitious materials and dried aggregates; capable of producing grout of the specified strength in accordance with ASTM C476 with the addition of water only.

1. Type: Fine.

2. Manufacturers:

a. Amerimix, an Oldcastle brand. www.amerimix.com

b. Spec Mix LLC. www.specmix.com

c. TCC Materials. ww.tccmaterials.com

d. Quikrete, The QUIKRETE Companies. www.quikrete.com

2.04 MORTAR AND GROUT MATERIALS FOR MASONRY, FULLY SITE MIXED

A. Applications: Only for use at permanently concealed locations or where manufacturer standard gray color is acceptable to Architect.

B. Aggregate for Site Mixing:

1. Mortar Aggregate for Site Mixing: Clean, hard, natural washed sand meeting ASTM C144. Provide aggregate from single source for colored mortar.

a. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.

b. For joints less than 1/4 inch (6.4 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.

c. White-Mortar Aggregates: Natural white sand or crushed white stone.

d. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

2. Grout Aggregate for Site Mixing: ASTM C404.

a. Size #1 for fine grout.

b. Size #8 for coarse grout when minimum horizontal dimension of grouting space exceeds 4".

C. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated. Alkali content will not be more than 0.1 percent when tested in accordance with ASTM C114.

1. Portland Cement Types Defined:

a. Type I - Normal; ASTM C150/C150M.

b. Type II - Moderate; ASTM C150/C150M.

c. Type III - High Early Strength; ASTM C150/C150M.

D. Hydrated Lime: ASTM C207, Type S.

E. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

F. Colored Mortar Additive for Masonry Cement or Portland Cement/Lime Mix:

1. Designed to be used with type N, S, M or O strength masonry cement or Portland and lime mixtures.
2. Pre-measured units, factory sealed bags for site mixing.
3. Pure natural and/or synthetic iron oxides finely milled (95-99% minus 325 mesh particle size) and blended to produce uniform and consist tinting strength for maximum coloring.
4. Inert and stable to atmospheric conditions, sunfast, weather resistant, alkali resistant, water insoluble, lime proof, nonbleeding natural and synthetic iron oxides, free of deleterious fillers and extenders.
5. Applicable Standards: Meets or exceeds the following.
   a. ASTM C979 - Pigments for Integrally Colored Mortar/Concrete.
6. Manufacturers:
   a. Solomon SGS Concentrated Mortar Colors. www.solomoncolors.com
   b. Davis Colors. www.daviscolors.com.
   c. Lambert Corporation. www.lambertusa.com.

G. Water: Clean, potable, free from deleterious amounts of alkalies, acids and organic materials.

H. Water-reducing and plasticizing admixtures: Provide admixtures meeting the following standards, and certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted. Do not use calcium chloride or admixtures containing calcium chloride.

1. Product approved for use by mortar and grout manufacturer.
2. Water-Reducing Admixture: ASTM C494, Type A.
3. Water-Reducing and Retarding Admixture: ASTM C494, Type D.
4. Water-Reducing and Accelerating Admixture: ASTM C494, Type E.
5. Plasticizing and Retarding Admixture: ASTM C1017, Type II.

2.05 ANCHORING GROUT AND CEMENT

A. Exterior and Wet Area Non-shrink, Nonmetallic Grout: Premixed, factory-packaged, non-staining, non-corrosive, non-gaseous, quick-setting, self-leveling, pourable cement base grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

1. BASF Building Products, MasterFlow 110 AN.
2. Bonsal American, Inc., ProSpec High Strength Precision Grout.
3. U. S. Grout Corp., Five Star Grout.

B. Interior Dry Area Anchoring Cement: Factory-packaged, non-shrink, non-staining, hydraulic-controlled expansion cement formulation for mixing with water at project site to create pourable anchoring, patching and grouting compound. Use for interior application only.

C. Non-Shrink Grout: Flowable, non-metallic, non-shrink, hydraulic cement-based, graded mineral-aggregate, controlled expansive type grout.
1. Acceptable Products:
a. BASF Building Products, Masterflow 713.
b. Dayton Superior, Burke Non-Ferrous, Non-Shrink Grout.
c. Laticrete International, Inc., L&M Crystex.
d. W. R. Meadows, Inc., 588 Precision Grout.

D. Coordinate grout and anchoring cement with project structural requirements and applicable Delegated-Design requirements. Notify project structural engineer of conflicts. Where conflict exists, the more stringent requirement shall apply.

2.06 PARGING MATERIALS FOR MASONRY, NON-WATERPROOF

A. Not for use at above grade permanently exposed locations. For use where concrete or masonry surfaces require additional surface preparation for installation of additional materials over the concrete or CMU.

B. Basis of Design: Parging Mix by Sakrete a business unit of TCC Group Companies. www.tccmaterials.com, www.sakretecanada.com
1. https://www.sakretecanada.com/en/sakrete-products/concrete-cement-masonry/mortars-parging-masonrymixes/sakrete-parging-mix.html

C. Acceptable Products: Subject to compliance with requirements.
1. Parging Mix by Kwik MIx. www.kwikmix.com
2. Parging Mix by Sakrete. www.tccmaterials.com, www.sakretecanada.com

D. General: Comply with ASTM C270.
1. For mortar parge coats, use Type S or Type N, as suitable for substrates at application area.
2. Pre-blended, ready to use mix of masonry cement, fine sand, ad additives designed to provide interior or exterior cementitious coating for decorative, aesthetic applications.
3. Suitable for use over masonry, and concrete.
4. For installation at 3/8 inch maximum depth.

E. Miscellaneous Parging Materials:

1. Provide in accordance with specified requirements for substrates indicated for parged finishing.

2.07 MORTAR AND GROUT MIX PROPORTIONS

A. Comply with manufacturer instructions and recommendations. Requirements indicated in this Section establish minimum requirements.

B. Non-Premixed Type S: Minimum 1800 psi 28-day compressive strength, job-mixed or bag-mixed mortar. Proportion materials by volume in accordance with ASTM C270, as follows:

1. One part masonry cement to 1/2 part Portland cement to aggregate proportioned at not less than 2-1/4 nor more than three times the volumes of cements used, or;

2. One part Portland cement and 1/4 to 1/2 part hydrated lime to aggregate proportioned at not less than 2-1/4 nor more than three times the combined volume of cement and lime used, or;

C. Pre-mixed, colored masonry cement: One part pre-mixed Type S masonry cement to aggregate proportioned not less than 2-1/4 nor more than three times the volume of masonry cement used, and as directed by masonry cement manufacturer's product data to produce Type S mortar.

1. Factory pre-blended, pre-bagged dry Type S mortar shall meet the requirements of ASTM C1714 and ASTM C270.

D. Cement grout: Proportion materials by volume in accord with ASTM C476 for fine or coarse grout as required; minimum 3000 psi compressive strength at 28 days in accord with ASTM C1019.

E. Anchoring cement for railings: Mix prepared anchoring cement product with water as directed by manufacturer's product data for immediate use.

F. Pointing mortar: One part masonry cement to one part Type S hydrated lime to four parts aggregate.

2.08 MORTAR MIXING

A. General:

1. Thoroughly mix mortar ingredients using mechanical, powered, batch mixer, in accordance with ASTM C270 and in quantities needed for immediate use.

2. For site-mixed mortars, add water-reducing and plasticizing admixture in accord with admixture manufacturer's product data.

3. Addition of other admixtures, including chloride-based admixtures and antifreeze ingredients, is not permitted.

4. If water is lost by evaporation, re-temper only within two hours of mixing.

5. Measure materials for job-mixed mortars in a one cubic foot measuring container. Do not measure using shovels or other hand tools.
6. Discard grout not placed within 1-1/2 hours after water is added to mix, or sooner as indicated by grout manufacturer.

B. Ready Mixed Mortar: ASTM C1142, Type equivalent to that specified according to ASTM C270.

C. Maintain sand uniformly damp immediately before the mixing process.

D. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio; mix in accordance with manufacturer's instructions, uniform in coloration.

E. Re-temper mortar as necessary to keep plastic. Do not use mortar after setting has begun or after 2-1/2 hours of initial mixing.

F. When used, add admixtures in accordance with manufacturer's instructions; mix uniformly.

2.09 GROUT MIXING

A. Mix grout in accordance with ASTM C94.

B. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance with ASTM C476 for fine and coarse grout.

C. When used, add admixtures in accordance with manufacturer's instructions; mix uniformly.

D. Do not use anti-freeze compounds to lower the freezing point of grout.

PART 3 EXECUTION

3.01 EXAMINATION

A. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 MORTAR AND GROUT INSTALLATION

A. Install mortar and grout to requirements of section(s) in which masonry is specified.

B. Comply with provisions of TMS 402/602, except where exceeded by requirements of the contract documents.

C. Use either high-lift or low-lift grout pouring techniques, at Contractor's option, subject to other limitations of Contract Documents.

3.03 PARGING, ABOVE GRADE AS SUBSTRATE PREP, NON-WATERPROOF/NON-DECORATIVE

A. For use where concrete or masonry surfaces require additional surface preparation for installation of additional materials over the concrete or CMU.

B. Parge exterior faces of above-grade walls, where indicated, in two uniform coats to a total thickness of 3/4 inch (19 mm). Dampen wall before applying first coat, and scarify first coat to ensure full bond to subsequent coat.

1. Do not install parged finish over through wall flashing or wall system weep locations.

C. Use a steel-trowel finish to produce a smooth, flat, dense surface with a maximum surface variation of 1/8 inch per foot (3.2 mm per 305 mm). Form a 45 degree wash at top of parging and a 45 degree cove at bottom.

D. Prior to covering, cure in accordance with manufacturer instructions. Damp-cure parging for at least 24 hours and protect parging until cured.

3.04 FIELD QUALITY CONTROL

A. Coordinate with the requirements of masonry cladding system where mortar or grout will be installed.

B. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, in accordance with ASTM C780.

C. Grout Test (Compressive Strength): For each mix provided, in accordance with ASTM C1019.

D. Fire-Resistance Rated Construction: Where applicable, inspect fire-rated CMU construction to determine compliance with construction documents per building code compliance.

END OF SECTION

SECTION 04 0515

EXTERIOR ADHERED MASONRY VENEER SYSTEM

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Thin masonry veneer cladding system at exterior vertical wall locations.
   1. For use with veneer 1-1/2 inches thick or less.

1.03 REFERENCES

A. American Iron and Steel Institute (AISI) Specification for the Design of Cold-Formed Steel Structural Members.

B. American National Standards Institute (ANSI):
   1. ANSI A137.1 American National Standard Specifications For Ceramic Tile.
   2. ANSI A108.01 - A108.17 American National Standard Specifications For The Installation Of Ceramic Tile.
   3. ANSI A118.1 - A118.15 American National Standard Specifications For The Installation Of Ceramic Tile.

C. ASTM International (ASTM):
   1. ASTM C144 Standard Specification for Aggregate for Masonry Mortar.
   2. ASTM C150 Standard Specification for Portland Cement.
   3. ASTM C482 Standard Test Method for Bond Strength of Ceramic Tile to Portland Cement.
   4. ASTM C794 Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants.
   5. ASTM C847 Standard Specification for Metal Lath.
   6. ASTM C920 Standard Specification for Elastomeric Joint Sealants.
   7. ASTM C955 Standard Specification for Load Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Board and Metal Plaster Bases.
   8. ASTM C1670 - Standard Specification for Adhered Manufactured Stone Masonry Veneer Units.
   9. ASTM C1780 - Standard Practice for Installation Methods for Adhered Manufactured Stone Masonry Veneer.

10. ASTM D1248 Standard Test Method for Staining of Porous Substances by Joint Sealants.
11. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
12. ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials.
13. Masonry Veneer Manufacturer's Association (MVMA) Installation Guide - www.ncma.org
14. Metal Lath/Steel Framing Association (ML/SFA) 540 Lightweight Steel Framing Systems Manual.
15. Steel Stud Manufacturers Association (SSMA) Product Technical Information and ICBO Evaluation Service, Inc. Report ER-4943P.
16. Tile Council of North America (TCNA) Handbook For Ceramic, Glass, and Stone Tile Installation.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation to discuss conformance with project requirements, manufacturer installation requirements, affected adjacent materials and system, and site conditions.

B. Attendees shall include contractor, adhered masonry veneer installer, manufacturer technical representative, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Manufacturer's data sheets on each product to be used.

C. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include drawings, elevations, and details.
   1. Provide plan drawings indicating locations on building.
   2. Indicate compliance with specified Performance Requirements.
   3. Delegated-Design Submittal: Analysis data signed and sealed by the qualified professional engineer responsible for their preparation. Provide submittal for the following items:
      a. Indication of compliance with specified Performance Requirements, signed and sealed by a professional structural engineer including calculations.
   4. Delegated-Designer Qualification Data: For professional engineer's experience with providing Delegated-Design engineering services of the kind indicated, including documentation that engineer is licensed in the State of Louisiana.

D. Submit sample manufacturer warranty, meeting the requirements of this specification.

E. Submit project specific shop drawings. Include project specific details and locations of all transitions, penetrations, and joints including expansion and control joints.

F. Submit manufacturer's certification that the materials supplied conform to ASTM C1670 for Adhered Manufactured Masonry Veneer Units.

G. Submit list from manufacturer of veneer installation system including adhesive, mortar, and grout identifying a minimum of three similar projects, each with a minimum of ten years of service.

1.06 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements. Warranty shall be completed in Owner's name and registered with manufacturer.

C. Maintenance Data: Provide manufacturer maintenance instructions for the materials of this Section. Include cleaning methods, cleaning solutions recommended, and stain removal methods.

D. Maintenance Materials:

1. Upon completion of the work of this Section, deliver to the Owner additional adhered masonry veneer and trim shape of each type, color, pattern and size used in the Work, as well as extra stock of adhesives, mortars, grouts and other installation materials for the Owner's use in replacement and maintenance.
2. Provide 2 percent or minimum four unopened cartons.
3. Extra stock shall be from same production run or batch as original adhered masonry veneer and installation materials.

1.07 QUALITY ASSURANCE

A. Veneer Manufacturer: Company specializing in thin manufactured masonry veneer, and trim units with 10 years minimum experience. Obtain from a single source with resources to provide products of consistent quality in appearance and physical properties.

B. Veneer Installation System Manufacturer: Company specializing in adhesives, mortars, grouts and other installation materials with 10 years minimum experience and ISO 9001 certification. Obtain installation materials from single source manufacturer to insure consistent quality and full compatibility.

C. Installer Qualifications: Company specializing in installation of thin veneer, manufactured masonry veneer, and trim unit with five years documented experience with installations of similar scope, materials and design.

D. Submit laboratory confirmation of adhesives, mortars, grouts and other installation materials:

1. Identify proper usage of specified materials using positive analytical method.
2. Identify compatibility of specified materials using positive analytical method.

3. Identify proper color matching of specified materials using a positive analytical method.

E. Third Party Inspector Qualifications: An independent third party exterior roof, wall, and waterproofing Consultant acceptable to Architect. Inspection service shall product reports and digital photographs documenting each inspection. Reports shall be made available to the Owner, Contractor, roofing/waterproofing installer, roofing/waterproofing material manufacturer and Architect. Inspections shall include substrate examination, beginning of installation, periodic intervals, and final inspection prior to encapsulating the work of this Section.

1.08 MOCKUPS

A. Mockup: Provide a mockup for evaluation of installation, finishes, and workmanship.

1. Provide mock-up of each type, style, finish, size, color of thin brick, manufactured masonry veneer, and trim unit along with respective installation adhesives, mortars, grouts, and other installation materials.
2. Locate as directed by Architect.
3. Size: Minimum 25 square feet in configuration directed by Architect.
4. Do not proceed with installation beyond mockup until the mockup installation is approved by Architect. Correct deficiencies and refinish mock-up area as required to produce acceptable work.

B. Subject to compliance with requirements, approved mockups may become part of the completed Work if accepted to remain by Architect and if undisturbed at time of Substantial Completion.

C. Approval of mockups does not constitute approval of deviations from the Contract Documents unless Architect specifically approves such deviations in writing.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Acceptance at Site: Deliver and store packaged materials in original containers with seals unbroken and labels, including grade seal, intact until time of use, in accordance with manufacturer's instructions.

B. Store adhered masonry veneer and installation system materials in a dry location; handle in a manner to prevent chipping, breakage, and contamination.

C. Protect latex additives, waterproofing membranes, epoxy adhesives and sealants from freezing or overheating in accordance with manufacturer's instructions; store at room temperature when possible.

D. Store Portland cement mortars and grouts in a dry location.

1.10 FIELD CONDITIONS

A. Provide ventilation and protection of environment as recommended by manufacturer.

B. Prevent carbon dioxide damage to thin brick, manufactured masonry veneer, and trim units as well as adhesives, mortars, grouts, and other installation materials, by venting temporary heaters to the exterior.

C. Maintain ambient temperatures not less than 50 degrees F (10 degrees C) or more than 100 degrees F (38 degrees C) during installation and for a minimum of seven days after completion. Comply with manufacturer recommendations.

1.11 WARRANTY

A. Special Contractor Warranty: The Contractor warrants the work of this Section to be in accordance with the Contract Documents and free from faults and defects in materials and workmanship.

1. Warranty Period: 5 years from date of Substantial Completion.

B. Special Manufacturer Warranty: The manufacturer of adhesives, mortars, grouts, and other installation materials warrants their materials of this Section to be in accordance with the Contract Documents and free from faults and defects.

1. Warranty Period: The manufacturer of adhesives, mortars, grouts, and other installation materials shall warrant their materials of this Section to be in accordance with the Contract Documents and free from faults and defects.

a. Warranty Period: 15 years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS, EXTERIOR APPLICATIONS

A. Delegated-Design: Engage a qualified professional engineer, licensed in the State of Louisiana to design adhered masonry veneer cladding system to meet the project requirements.

B. Provide system attachment, and support with the following characteristics:

1. General Performance: Masonry veneer cladding systems shall withstand exposure to weather and resist thermally induced movement without failure, rattling, or disengagement.

2. Design: Calculate structural support requirements of new adhered veneer cladding systems designed to comply with applicable codes and standards, including siesmic and wind resistance. Refer to project structural drawings for exterior cladding wind resistance requirements.

3. All system components shall be compatible and designed for permanent exterior exposure to UV and water.

4. Components shall not be corrosive when in contact.

5. Design Loads: As indicated on Drawings and as required by applicable building code.

6. Permanently suspended and supported. Able to tolerate movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
7. Able to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

C. Provide completed assemblies with the following characteristics:
1. Maximum Deflection of Vertical Assemblies: 1:360 under lateral point load of 100 lbs.
2. Maximum Deflection of Horizontal Assemblies: 1:240 deflection under dead loads and wind uplift.

D. Surface Burning per ASTM E84: Flame Spread: 0, Smoke Developed: 0.

E. Water Drainage: System shall drain incidental water down, out, and away from exterior walls.
1. Horizontally installed support members shall be configured and installed to shed and drain water. Zee shaped members shall be installed with exterior leg directed in downward direction.
2. At horizontal panel terminations, provide 1/4 inch wide hemmed drip edge with minimum 30 degree downward bend.

2.02 EXTERIOR ADHERED VENEER MANUFACTURERS

A. Thin Masonry Veneer:
1. Basis of Design: As indicated on Drawings. Where not indicated, as selected by Architect.
a. Drawing Designation: STN-1.
b. Drawing Designation: STN-2.
2. Performance and Technical Characteristics: As indicated by Basis of Design selection.

B. Acceptable Manufacturers: Subject to compliance with requirements.
1. Arriscraft USA, A General Shale Company. www.arriscraft.com.
2. Cedar Creek Stone. www.cedarcreekstone.com.
3. Centurion Stone. www.centurionstone.com.
4. Coronado Stone Products. www.coronado.com.
5. Cultured Stone, a Boral Company. www.boralamerica.com.
6. El Dorado Stone, a Headwaters Company. www.eldoradostone.com.
7. Environmental Stoneworks. www.estoneworks.com.

C. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:
1. Provide factory fabricated special shapes.

2. For ends of sills and caps and for similar applications that would otherwise expose unfinished surfaces, provide units without cores or frogs and with exposed surfaces finished.
3. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
4. Provide special shapes for applications requiring veneer of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
5. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
6. Provide "L" corner shapes at corners.
7. Provide solid cap shapes at low wall tops where indicated.
8. Watertable: Provide factory fabricated special shape where indicated.

2.03 ADHESIVE, MORTAR, AND GROUT MANUFACTURERS

A. Basis of Design: Laticrete International, Inc. www.laticrete.com

B. Acceptable Manufacturers: Subject to compliance with requirements.
1. Custom Building Products, Inc: www.custombuildingproducts.com
2. Laticrete International, Inc. www.laticrete.com/mvis

2.04 MISCELLANEOUS ACCESSORIES - EXTERIOR ADHERED VENEER, TYPICAL

A. General: Products of this Section establish minimum requirements. Comply with veneer and adhered system manufacturer recommendations and requirements. Where conflict in requirements exist, Architect shall provide final clarification.

B. Air and Water Barrier Membrane/Crack Suppression Membrane: Provide cold fluid applied, single component product. Membrane to be non-toxic, non-flammable, and non-hazardous during storage, mixing, application and when cured. It shall be certified by IAPMO and ICC approved as a shower pan liner and shall also meet the following physical requirements:
1. Basis of Design: Laticrete MVIS Air & Water Barrier.
a. Hydrostatic Test (ASTM D4068): Pass.
b. Elongation at Break (ASTM D751): 20-30%.
c. System Crack Resistance (ANSI A118.12): Pass (High).
d. 7 day Tensile Strength (ANSI A118.10): >265 psi (1.8 MPa).
e. 7 day Shear Bond Strength (ANSI A118.10); >200 psi (1.4 MPa).
f. 28 Day Shear Bond Strength (ANSI A118.4): >214 psi (1.48 - 2.4 MPa).
g. Service Rating (TCA/ASTM C627): Extra Heavy.
h. Total VOC Content: < 0.05 mg/m3.

2. Where acceptable to adhered veneer setting material manufacturer, project primary air and water barrier membrane specified in Section 07 2726 - Fluid Applied Air and Water Barrier System, is acceptable for use.

C. Secondary Bond Breaker/Cleavage Sheet: For use over primary air and water barrier system.

1. Basis of Design: Dupont Tyvek Stucco Wrap.
    a. Material: Spunbonded polyolefin, non-woven, non-perforated, barrier sheet designed to form drainage plane and bond breaker behind lath based cement plaster systems.
    b. Air Penetration: 0.004 cfm/ft2 at 75 Pa, when tested in accordance with ASTM E2178. Type I per ASTM E1677.
    c. Water Vapor Transmission: 50 perms, when tested in accordance with ASTM E96, Method B.
    d. Water Penetration Resistance: Minimum 210 cm when tested in accordance with AATCC Test Method 127.
    e. Basis Weight: 2.1 oz/yd2 when tested in accordance with TAPPI Test Method T-410.
    f. Air Resistance: 300 seconds, when tested in accordance with TAPPI Test Method T-460.
    g. Tensile Strength: 30/30 lbs/in., when tested in accordance with ASTM D882, Method A.
    h. Tear Resistance: 7/9 lbs, when tested in accordance with ASTM D1117.
    i. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E84. Flame Spread: 5, Smoke Developed: 25
2. 4.0 mils (0.1 mm) thick polyethylene plastic film complying with ASTM D4397.

D. Sealer (Exterior Masonry Veneers): water-based formula specifically designed for topical application on porous stones in exterior applications.

1. Basis of Design: Laticrete STONETECH Heavy Duty Exterior Sealer.

2.05 CEMENT BACKER BOARD

A. Cementitious Backer Board: Cementitious type complying with ANSI A118.9.

1. Provide product acceptable to thin veneer system manufacturer for project specific application.
2. Acceptable Products: Subject to compliance with requirements.
    a. USG Durock with EdgeGuard. www.usg.com
    b. James Hardie Building Products; Hardie Backer Board. www.jameshardie.com
    c. National Gypsum Company, Gold Bond ExP Tile Backer Board. www.goldbondbuilding.com
3. Characteristics:

a. Homogenous board, front back and sides, consisting of aggregated portland cement slurry with polymer-coated, glass-fiber mesh.

b. Smooth formed edges with factory edges ad square cut ends.

c. Suitable for installation over wood or metal substrates. Provide stainless steel screws in all locations. Hot dipped galvanized is acceptable for permanently dry interior locations.

4. Thickness: Minimum 1/4 inch. Provide thicker board in accordance with thin veneer system manufacturer for project specific application and as required to comply with project requirements.

2.06 INSTALLATION MATERIALS - EXTERIOR ADHERED VENEER - SETTING MATERIALS

A. Latex Portland Cement Mortar for Thick Beds to be weather, frost, shock resistant and meet the following physical requirements:

1. Basis of Design: Laticrete MVIS Premium Mortar Bed.

a. For use thick set non-lath applications and as a scratch coat.

2. Compressive Strength (ANSI A118.7 Modified): >4000 psi (27.6 MPa).

3. Total VOC Content: < 0.05 mg/m3.

B. Concealed Mortar - Latex Portland Cement Thin Bed Mortar for thin set to be weather, frost, shock resistant, non-flammable and meet the following physical requirements:

1. Basis of Design: Laticrete MVIS Hi-Bond Veneer Mortar.

a. For thin-set non-lath applications.

2. Compressive strength (ASTM C270): >=2900 psi (20 MPa).

3. Shear bond strength (ANSI A118.4 5.2.4): >=300 psi (2.1 MPa).

4. Sag On Wall (EN 1308): 0.0mm.

5. Total VOC Content: < 0.05 mg/m3.

C. Exposed Grout Face Joints in Veneer - Latex Portland Cement Pointing Mortar to be weather, frost and shock resistant, as well as meet the following physical requirements:

1. Basis of Design: Laticrete MVIS Premium Pointing Mortar.

a. For use at permanently exposed joints in veneer systems (i.e. grout joints).

2. Compressive Strength (ASTM C91): >=4100 psi (28.3 MPa).

3. Total VOC Content: < 0.05 mg/m3.

4. Colors - Permanently Exposed Mortar and Grout: As selected by Architect from manufacturer full range.

D. Epoxy Waterproofing Membrane/Flashing Mortar to be 3 component epoxy, trowel applied specifically designed to be used under masonry veneer, stone or thin brick:

1. Basis of Design: LATAPOXY Waterproof Flashing Mortar.

a. For use in waterproofing seams between flashings ad building elements.

2. Breaking Strength (ANSI A118.10): 450-530 psi (3.1-3.6 MPa).
3. Waterproofness (ANSI A118.10): No Water penetration.
4. 7 day Shear Bond Strength (ANSI A118.10): 110-150 psi (0.8-1 MPa).
5. 28 Day Shear Bond Strength (ANSI A118.10): 90-120 psi (0.6- 0.83 MPa).
6. 12 Week Shear Bond Strength (ANSI A118.10): 110-130 psi (0.8-0.9 MPa).
7. Total VOC Content: <3.4 g/L.

E. Expansion and Control Joint Sealant to be a one component, neutral cure, exterior grade silicone sealant and meet the following requirements:
1. Basis of Design: Laticrete MVIS Silicone Sealant.
a. For use a sealant filled expansion and control joints.
2. Tensile Strength (ASTM C794): 280 psi (1.9 MPa).
3. Hardness (ASTM D751; Shore A): 25 (colored sealant) /15 (clear sealant).
4. Weather Resistance (QUV Weather-meter): 10000 hours (no change).

F. Spot Bonding Adhesive: Adhered veneer manufacturer provided two component, high strength epoxy adhesive formulated for the spot bonding of stone and masonry veneer installations on vertical surfaces. Basis of Design: Laticrete Latapoxy 310.

PART 3 EXECUTION

3.01 GENERAL

A. Comply with adhered veneer system manufacturer instructions and recommendations. Requirements indicated establish minimum requirements.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 ASSEMBLY CONFIGURATION, EXTERIOR ASSEMBLIES

A. Concrete Block (CMU) Substrates: No exterior continuous insulation.
1. Concrete backup wall.
2. Fluid applied air and water barrier/crack suppression membrane, as specified this Section.
3. Setting materials, as specified this Section.
4. Thin masonry veneer, adhered.

B. Metal Stud Substrates: With exterior continuous insulation.
1. Metal stud backup wall.
a. Not specified in this Section. Refer to applicable specification section.
2. Exterior sheathing. Refer to applicable specification section.

a. Not specified in this Section. Refer to applicable specification section.

3. Fluid applied air and water barrier.
   a. Not specified in this Section. Refer to applicable specification section.
4. Through wall flashings and transitions.
   a. Not specified in this Section. Refer to applicable specification section.
5. Exterior continuous insulation.
   a. Not specified in this Section. Refer to applicable specification section.
6. Cement board, as specified this Section
7. Fluid applied air and water barrier/crack suppression membrane, as specified this Section.
8. Thin masonry veneer, adhered.

C. Metal Stud Substrates: No exterior continuous insulation.
1. Metal stud backup wall.
   a. Not specified in this Section. Refer to applicable specification section.
2. Exterior sheathing.
   a. Not specified in this Section. Refer to applicable specification section.
3. Fluid applied air and water barrier.
   a. Not specified in this Section. Refer to applicable specification section.
4. Through wall flashings and transitions.
   a. Not specified in this Section. Refer to applicable specification section.
5. Cement board, as specified this Section.
6. Fluid applied air and water barrier/crack suppression membrane, as specified this Section.
7. Thin masonry veneer, adhered.

3.03 SUBSTRATE EXAMINATION

A. Verify that surfaces to be covered with adhered veneer system comply with manufacturer recommendations including the following requirements:
1. Clean and free of dust, dirt, oil, grease, sealers, curing compounds, laitance, efflorescence, form oil, loose plaster, paint, and scale.
2. Not leveled with gypsum or asphalt based compounds.

B. Concrete Substrates:
1. Shall be cured a minimum of 28 days at 70 degrees F (21 degrees C), including an initial seven day period of wet curing.
2. Shall be wood float finished, or better, for thin bed method.

C. Substrate Variation Tolerances: Comply with adhered veneer system manufacturer instructions and the following minimum requirements.

1. For adhered veneer installations when a cementitious bonding material will be used, maximum allowable variation in the substrate - for finishes with edges shorter than 15 inches (375 mm), maximum allowable variation is 1/4 inch in 10 feet (6 mm in 3 m) from the required plane, with no more than 1/16 inch variation in 12 inches (1.5 mm variation in 300 mm) when measured from the high points in the surface.
2. For veneers with at least one edge 15 inches (375 mm) in length, maximum allowable variation is 1/8 inch in 10 feet (3 mm in 3 m) from the required plane, with no more than 1/16 inch variation in 24 inches (1.5 mm variation in 600 mm) when measured from the high points in the surface.
3. For thick bed (mortar bed) adhered veneer installations, maximum allowable variation in the installation substrate to be (1/4 inch in 10 feet (6 mm in 3 m).

D. Where substrate conditions do not meet manufacturer recommendations for thin bed installation method, correct substrate deficiencies for thin bed installation or provide thick bed metal lath installation.

3.04 INSTALLATION, GENERAL

A. Comply with manufacturer requirements and recommendations for preparation and installation of materials of this Section.

B. Fastener Holes and other Penetrations: Where fastener holes and other penetrations are created during installation of wall assemblies and not used (abandoned), fully seal hole with joint sealant and additional air/water barrier material in accordance with continuous air/water barrier manufacturer recommendations.

3.05 INSTALLATION OF AIR AND WATER BARRIER SYSTEMS, THROUGH WALL FLASHINGS, AND ACCESSORIES

A. Continuous Air and Water Barrier System: Comply with manufacturer requirements

B. Through Wall Flashing: Refer to the requirements of Section 07 6200 - Sheet Metal Flashing and Trim.

C. Additional Accessories: Provide and install additional accessories recommended and required by manufacturer for specified warranty.

3.06 INSTALLATION - ADHERED VEENERS

A. Install in accordance with manufacturer instructions and recommendations. Comply with system configuration requirements for specified warranty.

3.07 CLEANING

A. Clean excess mortar/epoxy from veneer surfaces with water before they harden and as work progresses. Do not contaminate open grout/caulk joints while cleaning. Sponge and wash veneers diagonally across joints. Do not use acids for cleaning. Polish with clean dry cloth. Remove surplus materials and leave premises broom clean.

3.08 PROTECTION

A. Protect finished installation in accordance with manufacturer recommendations.

B. Keep finished work undisturbed and protected until full cure and through date of Substantial Completion. Remove coverings as required for observation and inspection.

C. Replace, or restore, defective installed materials as well as damaged or soiled work prior to date of Substantial Completion.

3.09 FIELD QUALITY CONTROL

A. Manufacturer Field Technical Representative: Provide setting material manufacturer's qualified field technical representative during the Work to perform inspections, including documenting of materials of this Section prior to concealment.

1. Final Inspection: At the completion of the installation provide final inspection with the adhered veneer system setting material manufacturer technical field representative to evaluate the completed installation. All punch list items shall be completed prior to the scheduled inspection.

2. Manufacturer representative to indicate in inspection field report or technical department letter that installation is legible for specified warranty.

B. Third Party Inspector: Contractor shall engage a qualified testing agency to inspect substrate conditions, surface preparation, material application, protection, and components, and to furnish reports to Architect and materials manufacturer.

C. Coordination of Inspections: Cooperate with testing and inspection entities. Allow access to work areas and staging. Notify testing agency in writing of schedule for Work of this Section to allow sufficient time for testing and inspection.

1. Do not cover each layer of Work until testing and inspection is completed and accepted.

D. Notify manufacturer, any third party inspectors, Owner, and Architect in advance of times when lift devices and scaffolding will be relocated. Do not relocate lift devices and scaffolding until all parties have reasonable opportunity to make observations of work areas at lift device or scaffold location.

E. Reporting: Forward written inspection reports to the Architect within 10 working days of the inspection and test being performed.

F. Correction: Correct deficient applications not passing tests and inspections, make necessary repairs, and retest as required to demonstrate compliance with requirements.

G. Defects and Repairs: Contractor shall be solely responsible for repair of defective areas.

H. Repair Verification: Number and log each repair. Photograph work from multiple angles to adequately demonstrate extent and final result of work. Arrange for reinspection as directed by Architect.

END OF SECTION

SECTION 04 2000

UNIT MASONRY

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Concrete block for load bearing and non-load bearing applications.

B. Reinforcement and anchorage.

C. Accessories.

1.03 REFERENCES

A. Definitions:

1. CMU(s): Concrete masonry unit(s).
2. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

B. Reference Standards:

1. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units.
2. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units.
3. ASTM C270 - Standard Specification for Mortar for Unit Masonry.
4. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms.
5. ASTM E514/E514M - Standard Test Method for Water Penetration and Leakage Through Masonry.
6. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing.
7. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures.
8. UL (FRD) - Fire Resistance Directory.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation to discuss conformance with project requirements, manufacturer installation requirements, affected adjacent materials and system, and site conditions.

B. Attendees shall include contractor, unit masonry installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: For each type of product, including but not limited to the following.

1. Masonry units, for each type used on project.
2. Reinforcing steel.
3. Joint reinforcements and anchorage.
4. Indicate coordination of anchorage requirements for cladding and veneer assemblies to be installed over Unit Masonry.

C. Shop Drawings: Indicate pertinent dimensions, materials, anchorage, size and type of fasteners, and accessories for masonry support system.

1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
2. Include calculations or selections from the manufacturer's prescriptive design tables that indicate compliance with the applicable building code and project conditions.
3. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315. Show elevations of reinforced walls.
4. Indicate coordination of anchorage requirements for cladding and veneer assemblies to be installed over Unit Masonry.

D. Material Certificates: Provide written manufacturer certification for each type and size of the following:

1. Masonry Units: Include data on material properties and material test reports substantiating compliance with requirements.

E. Manufacturer's Qualification Statement.

F. Installer's Qualification Statement.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this Section with minimum 10 years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience and approved by manufacturer.

C. Comply with provisions of TMS 402/602, except where exceeded by requirements of the contract documents.

D. Fire Rated Assemblies: Comply with applicable code requirements for fire rated Unit Masonry construction.

1.07 MOCKUPS

A. Mockup: Provide a mockup for evaluation of installation, finishes, and workmanship.
   1. Locate as directed by Architect.
   2. Size: Minimum 150 square feet in configuration directed by Architect.

B. Do not proceed with installation beyond mockup until the mockup installation is approved by Architect. Correct deficiencies and refinish mock-up area as required to produce acceptable work.

C. Subject to compliance with requirements, approved mockups may become part of the completed Work if accepted to remain by Architect and if undisturbed at time of Substantial Completion. Remove mockup when directed by Architect.

D. Approval of mockups does not constitute approval of deviations from the Contract Documents unless Architect specifically approves such deviations in writing.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

B. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

1.09 FIELD CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
   1. Extend cover a minimum of 24 inches down both sides of walls, and hold cover securely in place.
   2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe, and hold cover in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
   1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
   2. Protect sills, ledges, and projections from mortar droppings.

3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602.
1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602.

1.10 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this section.
1. Warranty Period: One year from date of Substantial Completion.

B. Special Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, where items fail to perform as designed and manufactured.
1. Warranty Period: Provide manufacturer standard warranty.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS, STANDARD

A. Source Limitations:
1. Obtain permanently exposed masonry units from single manufacturer. Provide materials of consistent quality in appearance and physical properties.

B. Concrete Block: Comply with referenced standards and as follows:
1. Size: Unless noted otherwise, standard units with nominal face dimensions of 16 by 8 inches and nominal depth of 8 inches.
2. Special Shapes: Provide non-standard blocks configured for other detailed conditions.
a. Provide bullnose units for outside corners at permanently exposed interior locations. Bullnose radius shall be 3/8 inch unless indicated otherwise.
b. No bullnose at first course a finish floor a locations where additional finished wall base covering, such as resilient base or wood base, are to be installed.
3. Non-Structural and Non-Loadbearing Units: ASTM C90.
a. Standard Exposed Faces: Manufacturer's standard color and texture.

4. Structural and Load-Bearing Units: ASTM C90, normal weight. Coordinate with requirements indicated on project structural drawings and specifications.
    a. Standard Exposed Faces: Manufacturer's standard color and texture.

2.02 MORTAR AND GROUT MATERIALS

A. Refer to Section 04 0511 - Mortar and Masonry Grout.

2.03 PARGING MATERIALS

A. Refer to Section 04 0511 - Mortar and Masonry Grout.

2.04 REINFORCEMENT AND ANCHORAGE

A. For cladding or other veneer anchorage to Unit Masonry, refer to applicable cladding or veneer Section.

B. Manufacturers:
    1. Heckmann Building Products, Inc. www.heckmannbuildingprods.com
    2. Hohmann & Barnard, Inc. www.h-b.com.
    3. Wire-Bond, Inc. www.wirebond.com.

C. Reinforcing Steel: Type and size as indicated; refer to project structural Drawings and Specifications.

D. Joint Reinforcement: Use ladder type joint reinforcement where vertical reinforcement is involved and truss type elsewhere, unless otherwise indicated.

E. Single Wythe Joint Reinforcement: ASTM A951/A951M.
    1. Type: Ladder.
    2. Material: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M, Class 3.

F. Multiple Wythe Joint Reinforcement: ASTM A951/A951M.
    1. Type: Ladder.
    2. Material: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M, Class 3.

G. Adjustable Multiple Wythe Joint Reinforcement: ASTM A951/A951M.
    1. Type: Ladder, with adjustable ties or tabs spaced at 16 in (406 mm) on center.
    2. Material: ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M, Class B.

H. Strap Anchors: Bent steel shapes, 1-1/2 inch (38 mm) width, 0.105 inch (2.7 mm) thick, 24 inch (610 mm) length, with 1-1/2 inch (38 mm) long, 90 degree bend at each end to form a U or Z shape or with cross pins, hot dip galvanized to ASTM A153/A153M, Class B.

I. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not less than 5/8 inch (16 mm) of mortar coverage from masonry face.

1. Concrete Structural Support Components: Dovetail anchors of bent steel strap, nominal 1 inch (25 mm) width x 0.024 in (0.61 mm) thick, with trapezoidal wire ties 0.1875 inch (4.75 mm) thick, hot dip galvanized to ASTM A 153/A 153M, Class B.
2. Steel Structural Support Components: Crimped wire anchors for welding to frame, 0.25 inch (6.3 mm) thick, with trapezoidal wire ties 0.1875 inch (4.75 mm) thick, hot dip galvanized to ASTM A 153/A 153M, Class B.

2.05 FLASHINGS, THROUGH WALL FLASHINGS

A. Coordinate through wall flashings with the requirements of the following:

1. Section 07 2100 - Thermal Insulation.
2. Section 07 2730 - Fluid Applied Vapor Barrier System.
3. Section 07 6200 - Sheet Metal Flashing and Trim.

2.06 ACCESSORIES

A. Refer to Section 04 0511 - Mortar and Masonry Grout.

B. Refer to the requirements of specific veneer cladding system to be installed over Unit Masonry backup.

C. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.

1. Manufacturers:
   a. Blok-Lok Limited. www.blok-lok.com.
   b. Hohmann & Barnard, Inc. www.h-b.com.
   c. WIRE-BOND. www.wirebond.com.

D. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; in maximum lengths available.

1. Manufacturers:
   a. Hohmann & Barnard, Inc. www.h-b.com.
   b. WIRE-BOND. www.wirebond.com.
   c. W. R. Meadows, Inc. www.wrmeadows.com

E. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials. --

2.07 LINTELS

A. Refer to project Structural design requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
2. Verify that foundations are within tolerances specified.
3. Verify that reinforcing dowels are properly placed.
4. Verify that substrates are free of substances that impair mortar bond.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.

D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

F. Temperature: Comply with manufacturer instructions for installation of materials in cold and warm weather. Coordinate with TMS and applicable code requirements. Where conflict is found, the more stringent requirement shall apply.

3.03 COURSING

A. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

B. Bond: Running, unless noted otherwise.

C. Coursing: One unit and one mortar joint to equal 8 inches (200 mm), unless noted otherwise.

D. Mortar Joints:

1. Permanently Exposed Mortar Joints: Concave, unless noted otherwise.
2. Permanently Concealed Mortar Joints: Flush, unless noted otherwise.

3.04 MORTAR BEDDING AND JOINTING

A. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

B. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

C. Lay CMU as follows:

1. Bed face shells in mortar and make head joints of depth equal to bed joints.
2. Bed webs in mortar in all courses of piers, columns, and pilasters.
3. Bed webs in mortar in grouted masonry, including starting course on footings.
4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
5. Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.

D. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

E. Remove excess mortar from grout spaces.

F. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

G. Cut mortar joints flush where wall tile is scheduled, resilient base, or other surface applied interior wall finishes are scheduled.

H. Cut joints flush for masonry walls to receive cement plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

I. Cut joints flush where indicated to receive waterproofing, cavity wall insulation, and air and water barriers unless otherwise indicated.

3.05 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in bond pattern indicated; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4 inches. Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet if required before laying fresh masonry.

E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated. Do not mortar solid where flexible joints are indicated, or where thermal break is indicated.

G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.

H. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

I. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.

1. Terminate at underside of structure where indicated on Drawings.
2. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with project firestopping requirements.

3.06 GROUT PLACEMENT

A. Work grout into masonry cores and cavities to eliminate voids.

B. Do not displace reinforcement while placing grout.

C. Remove excess mortar from grout spaces.

D. Comply with provisions of TMS 402/602, except where exceeded by requirements of the contract documents.

E. Do not install grout in lifts greater than 16 inches (400 mm) without consolidating grout by rodding.

F. Use either high-lift or low-lift grout pouring techniques, at Contractor's option, subject to other limitations of Contract Documents.

3.07 CAVITY WALLS

A. Bond wythes of cavity walls together using adjustable thermally broken anchors. Refer to the requirements of masonry veneer specification Section for anchoring.

3.08 MASONRY JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (152 mm).

1. Space reinforcement not more than 16 inches (406 mm) o.c.
2. Space reinforcement not more than 8 inches (203 mm) o.c. in foundation walls and parapet walls.
3. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) beyond openings in addition to continuous reinforcement.

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

3.09 REINFORCED UNIT MASONRY

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in TMS 602.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.

3.10 MASONRY FLASHINGS

A. Coordinate with project exterior wall system requirements including wall cladding systems installed over unit masonry of this Section.

B. Coordinate with requirements indicated on Drawings, continuous weather/water barriers, joint sealants, and through wall flashing requirements of Section 07 6200 - Sheet Metal Flashing and Trim.

3.11 LINTELS

A. Coordinate with project structural requirements.

B. Coordinate with requirements of Section 07 9200 - Joint Sealants.

3.12 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete, to comply with the following minimum requirements:

1. Provide an open space not less than 1/2 inch wide between masonry and structural steel or concrete unless otherwise indicated.
    a. Coordinate with project structural engineering requirements for spacing between unit masonry and other structural materials.
    b. Keep open space free of mortar and other rigid materials.
2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally.

3.13 EXPANSION AND CONTROL JOINTS

A. General: Install expansion and control joint materials in masonry as masonry installation progresses. Do not allow materials to span expansion joints without provision to allow for in-plane wall or partition movement.

1. Coordinate with project structural requirements and project Drawings.

B. Do not continue horizontal joint reinforcement through control or expansion joints.

C. Provide control and expansion joints in accordance with BIA recommendations, manufacturer recommendations of materials to be installed over CMU, and applicable Delegated-Design requirements.

D. Form control joints in concrete masonry using as follows:

1. Install temporary foam-plastic filler in head joints, and remove filler when unit masonry is complete for final application of sealant joints. Coordinate with the requirements of Section 07 9200.

E. Provide horizontal, pressure-relieving joints by either leaving an airspace or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 07 9200 - Joint Sealants, but not less than 3/8 inch.

1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.14 TOLERANCES

A. General: Install masonry within the site tolerances found in TMS 402/602. Requirements of this Section establish minimum requirements.

B. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch (13 mm) or minus 1/4 inch (6.4 mm).
2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch (13 mm).
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch (6.4 mm) in a story height or 1/2 inch (13 mm) total.

C. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 ft. (6.4 mm in 3 m), or 1/2-inch (13-mm) maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 ft. (3.2 mm in 3 m), 1/4 inch in 20 ft. (6.4 mm in 6 m), or 1/2-inch (13-mm) maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 ft. (6.4 mm in 3 m), 3/8 inch in 20 ft. (10 mm in 6 m), or 1/2-inch (13-mm) maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 ft. (3.2 mm in 3 m), 1/4 inch in 20 ft. (6.4 mm in 6 m), or 1/2-inch (13-mm) maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 ft. (6.4 mm in 3 m), 3/8 inch in 20 ft. (10 mm in 6 m), or 1/2-inch (13-mm) maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 ft. (6.4 mm in 3 m), or 1/2-inch (13-mm) maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch (1.6 mm) except due to warpage of masonry units within tolerances specified for warpage of units.

D. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3.2 mm), with a maximum thickness limited to 1/2 inch (13 mm).
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3.2 mm).
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (10 mm) or minus 1/4 inch (6.4 mm).
4. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch (3.2 mm).

5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch (1.6 mm) from one masonry unit to the next.

3.15 CUTTING AND FITTING

A. Cut and fit for chases. Coordinate with other sections of work to provide correct size, shape, and location.

B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.16 PARGING, NON-WATERPROOF, AS SUBSTRATE PREP FOR ADDITIONAL FINISHES

A. As indicated in Section 04 0511 - Mortar and Masonry Grout. Where used, install after completion of Field Quality Control requirements of this Section.

3.17 FIELD QUALITY CONTROL

A. Inspection and Testing Agency: Contractor shall engage a qualified testing agency to perform tests and inspections. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements will be at Contractor's expense

B. Inspection and Testing Requirements:

1. Comply with inspection and testing requirements of applicable project codes and regulations.
2. Comply with inspection and testing requirements of project structural engineer.

C. Concrete Masonry Unit Test: For each type of unit provided, in accordance with ASTM C140 for compressive strength.

D. Fire-Resistance Rated Construction: Where applicable, inspect fire-rated CMU construction to determine compliance with construction documents per building code compliance.

3.18 PROTECTION

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

3.19 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent

construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

END OF SECTION

SECTION 04 7200

CAST STONE MASONRY

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Architectural cast stone.

1.03 REFERENCES

A. Definitions:

1. Cast Stone: A refined architectural concrete building unit manufactured to simulate natural cut stone.
2. Wet Cast: Manufactured from measurable slump concrete.
    a. Wet casting method: Manufactured from measurable slump concrete and vibrated into a mold until it becomes densely consolidated.

B. Reference Standards:

1. ACI 318: Building Code Requirements for Reinforced Concrete.
2. ASTM C33: Standard Specification for Concrete Aggregates.
3. ASTM C150: Standard Specification for Portland Cement.
4. ASTM C595: Blended Cement.
5. ASTM C1157: Hydraulic Cement.
6. ASTM C173: Standard Test Method for Air Content of Freshly Mixed Concrete by the Volume Method.
7. ASTM C231: Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
8. ASTM C260: Standard Specification for Air-Entrained Admixtures for Concrete.
9. ASTM C426: Standard Test Method for Linear Shrinkage of Concrete Masonry Units.
10. ASTM C494/C494M: Standard Specification for Chemical Admixtures for Concrete.
11. ASTM C618 – Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
12. ASTM C666/666M: Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing.

13. ASTM C979: Standard Specification for Coloring Pigments for Integrally Colored Concrete.
14. ASTM C989: Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete.
15. ASTM C1194: Standard Test Method for Compressive Strength of Architectural Cast Stone.
16. ASTM C1195: Standard Test Method for Absorption of Architectural Cast Stone.
17. ASTM C1364: Standard Specification for Architectural Cast Stone.
18. Cast Stone Institute Technical Manual.
19. TMS 404-504-604: Standards for Architectural Cast Stone Design, Fabrication, Installation.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation to discuss conformance with project requirements, manufacturer installation requirements, affected adjacent materials and system, and site conditions.

B. Attendees shall include contractor, cast stone installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: For the products and materials of this Section.
   1. Include copies of material test reports for completed projects, indicating compliance of cast stone with ASTM C1364.
   2. Include cast stone recommended or approved water repellent. Written approval of specific product shall be provided by cast stone manufacturer.

C. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
   1. Delegated-Design: Include analysis data along with the design engineer's seal and signature on each sheet of shop drawings.
   2. Prepare shop drawings using field measurements of installation areas.
   3. Show fabrication and installation data for cast stone including the following:
      a. Panel elevations, sections, details, and dimensions. Minimum plan drawing scale of 1/4 inch equals 1 foot. Minimum section drawing scale of 3/4 inch equals 1 foot. Minimum detail drawing scale of 3 inches equals 1 foot.
      b. Dimensions of typical cast stone items.

c. Finishes.

d. Joint and connection details.

e. Erection details.

f. Details including sizes, spacings, thicknesses, and yield strengths of various members.

g. Locations and details of connection hardware attached to structure.

h. Sizes, locations, and details of flex, gravity, and anchors for cast stone items.

i. Erection sequence for special conditions.

j. Relationship to adjacent materials.

k. Description of loose, cast-in, and field hardware.

l. Indicate compliance with "Performance Requirements" article of this Section.

D. Delegated-Designer Qualification Statement: Written certification of compliance with specified design requirements.

E. Manufacturer Qualification Statement: Written certification of compliance with specified manufacturer requirements.

F. Color and Finish Selection Samples: Submit color charts indicating full range available for selection. Provide photographs of each selection option.

G. Color and Finish Verification Samples: Only when requested by Architect, provide pieces of actual cast stone components not less than 6 inches square, of each color and finish selected, illustrating range of color and texture to be anticipated in actual components furnished for the project.

1.06 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements. Warranty shall be completed in Owner's name and registered with manufacturer.

C. Maintenance Data: Provide manufacturer maintenance instructions for the materials of this Section.

1.07 QUALITY ASSURANCE

A. Delegated-Design Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State of Louisiana.

B. Manufacturer Qualifications:

1. A firm with a minimum of 5 years experience producing cast stone of types required for project.

2. Current producer member of the Cast Stone Institute or the Architectural Precast Association.

3. Manufacturer's production facility currently holds a Plant Certification from the Cast Stone Institute or the Architectural Precast Association.
4. Adequate plant capacity to furnish quality, sizes, and quantity of cast stone required without delaying progress of the work.

C. Installer Qualifications: Minimum of five years documented installation experience for projects similar in scope and complexity to this Project, and currently an Installer Member of the Cast Stone Institute.

D. Testing Agency Qualifications: Qualified according to ASTM E329 for testing indicated.

E. Standards: Comply with the requirements of the Cast Stone Institute Technical Manual and the project specifications. Where a conflict may occur, the contract documents shall prevail.

1.08 MOCKUPS

A. Mockup: Provide a mockup for evaluation of installation, finishes, and workmanship.
1. Size: Minimum two fabricated units in configuration directed by Architect.

B. Do not proceed with installation beyond mockup until the mockup installation is approved by Architect. Correct deficiencies and refinish mock-up area as required to produce acceptable work.

C. Subject to compliance with requirements, approved mockups may become part of the completed Work if accepted to remain by Architect and if undisturbed at time of Substantial Completion.

D. Approval of mockups does not constitute approval of deviations from the Contract Documents unless Architect specifically approves such deviations in writing.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver cast stone components secured to shipping pallets and protected from damage and discoloration. Protect corners from damage.

B. Number each piece individually to match shop drawings and schedule.

C. Store cast stone components and installation materials in accordance with manufacturer's instructions.

D. Store cast stone components on pallets with nonstaining, waterproof covers. Ventilate under covers to prevent condensation. Prevent contact with dirt.

E. Protect cast stone components during handling and installation to prevent chipping, cracking, or other damage.

F. Store mortar materials where contamination can be avoided.

G. Schedule and coordinate production and delivery of cast stone components with unit masonry work to optimize on-site inventory and to avoid delaying the work.

H. Pack, handle, and ship cast-stone units in suitable packs or pallets.

1. Lift with wide-belt slings; do not use wire rope or ropes that might cause staining. Move cast-stone units if required, using dollies with wood supports.

2. Store cast-stone units on wood skids or pallets with nonstaining, waterproof covers, securely tied. Arrange to distribute weight evenly and to prevent damage to units. Ventilate under covers to prevent condensation.

I. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

J. Store mortar aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

1.10 PROJECT CONDITIONS

A. Coordinate installation with National Concrete Masonry Association (NCMA) and Brick Industry Association (BIA) recommendations.

B. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Comply with cold-weather construction requirements in TMS 602/ACI 530.1/ASCE 6.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and above and will remain so until cast stone has dried, but no fewer than seven days after completing cleaning.

C. Hot-Weather Requirements: Comply with hot-weather construction requirements in TMS 602/ACI 530.1/ASCE 6.

1.11 WARRANTY

A. Manufacturer Special Warranty: Provide cast stone manufacturer Limited Warranty guaranteeing that the manufactured cast stone complies with specified requirements and will remain free from defects in material and workmanship.

1. Exclusions: Warranty shall exclude the following.

a. Improper storage, handling and installation of the product.

b. Failure to follow Cast Stone Institute Technical Manual guidelines.

c. Installation of defective cast stone product.

d. Improper washing, cleaning, or sealing not approved by the Cast Stone Institute manufacturer member.

e. Contact with paint and other chemicals indicated to be detrimental by the Cast Stone Institute manufacturer member.

f. Structural building settlement, acts of nature, negligent acts of others.

g. Crazing as defined by Cast Stone Institute Technical Bulletin #32.

h. Efflorescence as defined by Cast Stone Institute Technical Bulletin #33.

i. Chipping not visible under direct daylight illumination from a distance of 6-feet.

j. Dimensional variations in color range variations, length, cross section, warp, bow, twist, dowel hole locations, anchor slots, flashing grooves, false joints, and other features that are within tolerances indicated in ASTM C1364.

2. Coverage: Manufacturer shall replace the defective product with new to match, free of charge or refund the Owner the full purchase price; at the Owner' sole discretion.

3. Warranty Term: 10-years from date of Substantial Completion.

B. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with requirements.

1. Arriscraft, a General Shale Company. www.arriscraft.com
2. Cast Stone Systems, Inc. www.caststonesystems.com
3. Handalstone. www.handalstone.com
4. Lightweight Stone Concepts. www.lightweightstoneconcepts.com
5. Tanner Stone. www.tannerstone.com
6. Melton Classics. www.meltonclassics.com
7. Reading Rock, Inc. www.readingrock.com

2.02 PERFORMANCE REQUIREMENTS, CAST STONE ASSEMBLIES

A. Structural Performance: Cast stone assemblies, including anchors, connections, and attachment to structural backup shall withstand the following design loads as well as the effects of thermal- and moisture-induced dimensional changes within limits and under conditions indicated:

1. Design requirements of applicable codes. Coordinate with project structural design requirements.
2. Wind Loads: As indicated on structural drawings and referenced code.
3. Deflection Limits: Design panel frames to withstand design loads without lateral deflections greater than 1/240 of wall span.
4. Thermal Movements: Provide for thermal movements resulting from annual ambient temperature changes of 120 deg F.
5. Design connections to accommodate deflections and other building movements.

6. Reinforcement and Anchorage: Provide reinforcement and anchorage as required to withstand handling and structural stresses; comply with ACI 318. Comply with requirements of applicable codes.

B. AISI Specifications: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."

C. AISC Specifications: Comply with AISC 360, "Specification for Structural Steel Buildings."

2.03 ARCHITECTURAL CAST STONE

A. Cast Stone: Architectural concrete product manufactured to simulate appearance of natural stone, complying with ASTM C1364.

1. Casting Method: Wet cast.
2. Compressive Strength: As specified in ASTM C1364; calculate strength of pieces to be field cut at 80 percent of uncut piece. Minimum 6,500 psi at 28 days per ASTM C1195.
3. Absorption: ASTM C1195: 6.0% maximum at 28 days.
4. Air Content: Provide sufficient air content to meet the freeze-thaw requirements for wet cast products, when the air content is tested in accordance with Test Method C173/C173M or Test Method C231/C231M. Air entrainment is not required for Vibrant Dry Tamp (VDT) products.
5. Freeze-Thaw: ASTM C666/C666M in accordance with ASTM C1364. The CPWL shall be less than 5.0% after 300 cycles of freezing and thawing.
6. Linear Drying Shrinkage: Per ASTM C426. Test and report in accordance with ASTM C1364.

B. Fire Ratings: Comply with wall assembly fire rating requirements of project as indicated.

C. Reinforcement and Anchorage: Provide reinforcement and anchorage as required to withstand handling and structural stresses; comply with ACI 318. Comply with requirements of applicable codes.

D. Shapes: Provide shapes indicated on Drawings.

1. Variation from Any Dimension, Including Bow, Camber, and Twist: Maximum of plus/minus 1/8 inch or length divided by 360, whichever is greater, but not more than 1/4 inch.
2. Unless otherwise indicated on drawings, provide:
   a. Wash or slope of 1:12 on exterior horizontal surfaces. Slope to drain down toward exterior face.
   b. Integral drips where cast stone projects one-inch or more. Minimum drip size shall be 3/8 by 3/8 inch set minimum 1/2 inch from front face, unless recommended otherwise by cast stone manufacturer.
   c. Raised fillets at back of sills and at ends to be built in/integral to cast stone unit.

E. Provide cast stone with factory water repellent built in/integral to cast stone unit.

2.04 FINISHES

A. Texture: As selected by Architect from manufacturer full range. Basis of design shall be smooth texture.

B. Color Selections: As selected by Architect from manufacturer full range.

2.05 RAW MATERIALS

A. Portland Cement: Type I or Type III, white and/or grey, in accordance with ASTM C150.

B. Coarse aggregates: Granite, quartz or limestone, in accordance with ASTM C33, except for gradation, and are optional for the Vibrant Dry Tamp (VDT) casting method.

C. Fine aggregates: Manufactured or natural sands, in accordance with ASTM C33, except for gradation.

D. Colors: Inorganic iron oxide pigments, in accordance with ASTM C979 except that carbon black pigments shall not be used.

E. Admixtures: Comply with the following.

1. ASTM C260 for air-entraining admixtures.
2. ASTM C494/C495M Types A - G for water reducing, retarding, accelerating and high range admixtures.
3. Other admixtures: Integral water repellents and other chemicals, for which no ASTM Standard exists, shall be previously established as suitable for use in concrete by proven field performance or through laboratory testing.
4. ASTM C618 mineral admixtures of dark and variable colors shall not be used in surfaces intended to be exposed to view.
5. ASTM C989 granulated blast furnace slag may be used to improve physical properties. Tests are required to verify these feature.

F. Water: Potable

G. Reinforcing Bars:

1. ASTM A615/A615M: Grade 40 or 60 steel galvanized or epoxy coated when cover is less than 1.5 in.
2. Welded Wire Fabric: In accordance with STM A1064/A1064M, galvanized or ASTM A884/A884M, epoxy coated; where applicable for wet cast units.

H. All anchors, dowels and other anchoring devices and shims shall be standard commercial building stone anchors commercially available in or stainless steel Type 302 or 304 of configuration and size as required for conditions.

2.06 ACCESSORY MATERIALS

A. Mortar: Portland cement-lime, as specified in Section 04 0511.

B. Grout: As specified in Section 04 0511.

C. Weep Tubes with Wicks: For use at stone veneer, including cast stone.

1. Design: Prefabricated 3/8 inch outside diameter by 1/4 inch in diameter, minimum 4 inch long rigid vinyl tube with brass screening at face. Twisted twisted rope wicks inserted full length of tube extending minimum 6 inches beyond rear of tube (cavity side).
2. Extending minimum 6 inches at rear, cavity side. Tube shall be field cut to length for specific application.
3. Acceptable Products:
   a. Heckmann Building Products, Inc., #330 Plastic Weephole: www.heckmannbuildingprods.com
   b. Hohmann & Barnard, Inc., #341 Series: www.h-b.com
   c. Wire-Bond, Inc; #3600 Clear Round Weep hole: www.wirebond.com

D. Cleaner: General-purpose cleaner designed for removing mortar and grout stains, efflorescence, and other construction stains from new masonry surfaces without discoloring or damaging masonry surfaces.

1. Shall be approved for intended use by cast stone manufacturer and by cleaner manufacturer for use on cast stone and adjacent masonry materials.
2. Coordinate with requirements of all adjacent materials exposed to cleaners for full compatibility.

E. Bituminous Paint/Coating: Refer to Section 07 1115 - Protective Bituminous Paint Coating.

1. Coordinate with requirements of product/material manufacturer(s) of this Section.
2. For use as corrosion protection between dissimilar materials.
3. Apply in two coats for full coverage minimum 30 dry mil thickness, unless indicated otherwise.

2.07 FABRICATION

A. General: Comply with manufacturer and specified requirements.

B. Reinforcing:

1. Reinforce the units as required by the drawings and for safe handling and structural stress. Minimum reinforcing shall be 0.25 percent of the cross section area.
2. Reinforcement shall be noncorrosive where faces exposed to weather are covered with less than 1.5 in. of concrete material. All reinforcement shall have minimum coverage of twice the diameter of the bars.
3. Panels, soffits and similar stones greater than 24 in. (600 mm) in one direction shall be reinforced in that direction. Units less than 24 in. (600 mm) in both their length and width dimension shall be non- reinforced unless otherwise specified.
4. Welded wire fabric reinforcing shall not be used in dry cast products.

C. Curing:

1. Cure units in a warm curing chamber approximately 100ºF (37.8ºC) at 95 percent relative humidity for approximately 12 hours, or cure in a 95 percent moist environment at a minimum 70ºF (21.1ºC) for 16 hours after casting. Additional yard curing at 95 percent relative humidity shall be 350 degree-days (i.e. 7 days at 50°F (10°C) or 5 days at 70°F (21°C) prior to shipping. Form cured units shall be protected from moisture evaporation with curing blankets or curing compounds after casting.

D. Manufacturing Tolerances:

1. Cross section dimensions shall not deviate by more than ±1/8 in. from approved dimensions. Length of units shall not deviate by more than length/ 360 or ±1/8 in., whichever is greater, not to exceed ±1/4 in.
2. Maximum length of any unit shall not exceed 15 times the average thickness of such unit unless otherwise agreed by the manufacturer.
3. Warp, bow or twist of units shall not exceed length/ 360 or ±1/8 in., whichever is greater.
4. Location of dowel holes, anchor slots, flashing grooves, false joints and similar features.
    a. On formed sides of unit, 1/8 in.
    b. On unformed sides of unit, 3/8 in. maximum deviation.

E. Production Quality Control:

1. Testing.
    a. Test compressive strength and absorption from specimens taken from every 500 cubic feet of product produced.
    b. Perform tests in accordance ASTM C1194 and C1195.
    c. Have tests performed by an independent testing laboratory every six months.
    d. Mix designs shall be tested for strength and absorption compliance prior to producing units.
    e. Retain copies of all test reports for a minimum of two years.

F. Color And Finish:

1. All surfaces intended to be exposed to view shall have a fine-grained texture similar to natural stone, with no air voids in excess of 1/32 in. and the density of such voids shall be less than 3 occurrences per any 1 in.2 and not obvious under direct daylight illumination at a 5 ft distance.
2. Units shall exhibit a texture approximately equal to the approved sample when viewed under direct daylight illumination at a 10 ft distance.
3. ASTM D2244 permissible variation in color between units of comparable age subjected to similar weathering exposure.
    a. Total color difference – not greater than 6 units.
    b. Total hue difference – not greater than 2 units.

4. Minor chipping resulting from shipment and delivery shall not be grounds for rejection. Minor chips shall not be obvious under direct daylight illumination from a 20-ft distance.
5. The occurrence of crazing or efflorescence shall not constitute a cause for rejection. Remove cement film, if required, from exposed surfaces prior to packaging for shipment.

2.08 DELIVERY, STORAGE AND HANDLING

A. Mark production units with the identification marks as shown on the shop drawings. Package units and protect them from staining or damage during shipping and storage. Provide an itemized list of product to support the bill of lading.

PART 3 EXECUTION

3.01 GENERAL

A. Coordinate installation with National Concrete Masonry Association (NCMA) and Brick Industry Association (BIA) recommendations.

3.02 EXAMINATION

A. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.03 SETTING CAST STONE IN MORTAR

A. Set cast stone in accordance with Delegated Design requirements, manufacturer instructions and recommendations, and as indicated in TMS 604, TMS 402.

B. Coordinate with the requirements of the following sections:
1. 04 0511 - Mortar and Masonry Grout.
2. 07 6200 - Sheet Metal Flashing and Trim.
3. 07 9200 - Joint Sealants.

C. Set units in full bed of mortar with full head joints unless otherwise indicated.
1. Wet units with clean potable water prior to setting.
2. Fill dowel holes and anchor slots with mortar.
3. Fill collar joints solid as units are set.
4. Build concealed flashing into mortar joints as units are set.
5. Keep head joints in copings and between other units with exposed horizontal surfaces open to receive sealant.
6. Keep joints at shelf angles open to receive sealant.
7. Rake mortar joints 3/4 in. in for pointing.

D. Joint Size: 3/8 inch unless indicated otherwise. Do not exceed joint size recommended by Cast Stone Institute or manufacturer.

E. Rake out joints for pointing with mortar to depths of not less than 3/4 inch. Rake joints to uniform depths with square bottoms and clean sides. Scrub faces of units to remove excess mortar as joints are raked.

F. Point mortar joints by placing and compacting mortar in layers not greater than 3/8 inch. Compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.

G. Tool exposed joints slightly concave when thumbprint hard. Use a smooth plastic jointer larger than joint thickness.

H. Rake out joints for pointing with sealant to depths of not less than 3/4 inch. Scrub faces of units to remove excess mortar as joints are raked.

1. Joint Profile: As selected by Architect.

I. Provide sealant joints at head joints of copings and other horizontal surfaces; at expansion, control, and pressure-relieving joints; and at locations indicated.

1. Keep joints free of mortar and other rigid materials.

2. Prepare and apply sealant of type and at locations indicated to comply with applicable requirements in Section 07 9200 - Joint Sealants.

3.04 INSTALLATION TOLERANCES

A. Comply with Cast Stone Institute Technical Manual.

B. Variation from Plumb: Do not exceed 1/8 inch out of plane with adjacent units.

C. Variation from Level: Do not exceed 1/8 inch out of plane with adjacent units.

D. Variation in Joint Width: Do not vary joint thickness more than 1/8 inch in 36 inches or one-fourth of nominal joint width, whichever is less.

1. Typical: Plus 1/16 inch, minus 1/8 inch.

E. Variation in Plane between Adjacent Surfaces (Lipping): Do not vary from flush alignment with adjacent units or adjacent surfaces indicated to be flush with units by more than 1/16 inch, except where variation is due to warpage of units within tolerances specified.

3.05 ADJUSTING AND CLEANING

A. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by Architect. If approved, repair chips using touchup materials furnished by manufacturer.

B. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.

C. In-Progress Cleaning: Clean cast stone as work progresses.

1. Remove mortar fins and smears before tooling joints.
2. Remove excess sealant immediately, including spills, smears, and spatter.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample; leave one sample uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of cast stone.
3. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet surfaces with water before applying cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
5. Clean cast stone by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20. Utilize chemical cleaning solutions only when bucket-and-brush hand-cleaning method does not provide results acceptable to Architect. Consult with manufacturer for appropriate cleaners.

END OF SECTION

SECTION 05 1200

STRUCTURAL STEEL

PART 1 - GENERAL

1.1 Related Documents:

A. Section Includes:

1. Structural steel framing members, support members, bracing members and connections.
2. Base plates, leveling plates, anchor bolts, leveling nuts, shear stud connectors, deformed bars welded to structural steel, and bolts.
3. Grouting under base plates.
4. Verification of anchor bolt setting and levels to assure adequate fit of the steel work.

B. Related Sections:

1. Division 05 Section "Steel Roof Decking".
2. Division 05 Section "Steel Joists".

1.2 REFERENCES

A. General:

1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.

B. ASTM International:

1.	ASTM A27 / A27M	Standard Specification for Steel Castings, Carbon, for General Application
2.	ASTM A47 / A47M	Standard Specification for Ferritic Malleable Iron Castings
3.	ASTM A53 / A53M	Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
4.	ASTM A108	Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished
5.	ASTM A123 / A123M	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
6.	ASTM A153 / A153M	Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

7.	ASTM A283 / A283M	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
8.	ASTM A307	Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength
9.	ASTM F3125	Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
10.	ASTM A385	Practice for Providing High-Quality Zinc Coatings (Hot-Dip)
11.	ASTM A500 / A500M	Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
12.	ASTM A525	General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
13.	ASTM A36 / A36M	Standard Specification for Carbon Structural Steel
14.	ASTM A572 / A572M	Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
15.	ASTM A780	Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
16.	ASTM A992 / A992M	Standard Specification for Structural Steel Shapes
17.	ASTM D2092	Recommended Practices for Preparation of Zinc-Coated Steel Surfaces for Painting
18.	ASTM F1554	Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength

C. American Welding Society:

1. AWS D1.1 - Structural Welding Code

D. American Institute of Steel Construction (AISC):

1. AISC 303 – Code of Standard Practice for Steel Buildings and Bridges except the following shall be added to 3.1 (f): Horizontal and vertical dimensions may not be shown entirely on the Structural Drawings.
2. AISC 360 – Specification for Structural Steel Buildings
3. AISC - Steel Construction Manual
4. RCSC -Research Council on Structural Connections "Specification for Structural Joints Using High-Strength Bolts

1.3 DEFINITIONS

A. Heavy Shapes: ASTM A6, Group 3 shapes with flanges thicker than 1-1/2 inches (12.5 mm), Group 4 shapes, and Group 5 shapes; welded built-up members with web or flange plates exceeding 1-1/2 inches (12.5 mm) in thickness

1.4 SUBMITTALS

A. Shop drawings for structural steel fabrications shall be submitted for review prior to fabrication. Examples include, but are not limited to:

1. Complete fabrication and erection plans and procedures giving full information on aspects of the erection which will affect alignment, plumb and dimensional accuracy of the structure.
2. Connections including size and spacing of bolts and welds.
3. Indicate profiles, sizes, spacing, and locations of structural members, openings, camber and attachments. Indicate welded connections with AWS welding symbols. Indicate net weld lengths. Details of welding materials, equipment, sequence and technique to be used. Shop and erection details incorporating seismic critical welds shall include explicit references to corresponding weld procedure specifications.
4. The Contractor shall survey, review and confirm as-built conditions prior to developing shop drawings. Field modifications to suit as-built conditions shall be at the Contractor's expense.
5. Stamped drawings by an Engineer licensed in Louisiana shall be provided for:

    a. Moment connections (beam to beam, beam to column)

    b. Column splices

    c. Stair stringers, handrails, and landings.

6. Corrections or comments made on shop drawings during review do not relieve contractor from compliance with the requirements of the drawings and specifications. The review is only an examination of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The contractor is responsible for confirming and correlating all sizes, quantities, and dimensions; selecting fabrication and erection processes and techniques of construction; coordinating his work with that of all other trades; and performing his work in a safe and satisfactory manner.

B. Welder Performance Qualification Records (WPQR): Contractor shall submit WPQR for each shop and field welder, and for the Certified Welding Inspector to the Architect for review.

1. It is the Erector's responsibility to engage a qualified Certified Weld Inspector (CWI) if one is not employed internally.

C. Welders' Certificates: Documentation certifying each welder and the Certified Welding Inspector employed on the work meets AWS qualifications.

D. Manufacturer's Certificates: Submit certification that manufactured products (including bolts, nuts and washers) meet or exceed specified requirements. Manufactured products are to be delivered in unopened containers. Certification numbers must appear on product containers for bolts, nuts and washers and the numbers shall correspond to the identification numbers on the Manufacturer's Certificate. The Manufacturer's symbol and grade markings must appear on bolts, nuts and washers. Submit manufacturer's certification that structural shapes contain specified percentage recycled material.

E. Product data: Submit certification that manufactured products meet or exceed specified requirements.

1. Weld filler material including filler metal Charpy V-Notch test values, electrodes, fluxes and shield gases.
2. Prime paint.
3. Welded studs.
4. Cold-galvanizing compound for touch-up, as required.

F. Mill Test Reports: Submit mill test reports indicating structural strength, destructive and nondestructive test analysis and chemical analyses from each heat of steel used in the work.

1.5 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with AISC specifications.

B. Welders shall be qualified in accordance with AWS D1.1 for each process, position and joint configuration.

C. Maintain one copy of each referenced document on site.

D. Survey anchor bolts for location and elevation prior to casting concrete.

E. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-certified plant, category STD.

F. Erector Qualifications: Company with a documented experience in performing the work of this Section and participates in the AISC Quality Certification program and is designated as AISC-certified erector, category CSE.

G. The design of connections not detailed on the Drawings shall be under the direct supervision of a Professional Engineer experienced in design of this work and licensed in the State of Louisiana.

1.6 TESTS AND INSPECTIONS

A. Welding Tests and Inspections

1. All welds shall be visually inspected by an AWS Certified Weld Inspector in accordance with AWSD1.1 and in accordance with AWS B1.1 “Guide for Visual Examination of Welds”
2. It is the Fabricator’s responsibility to provide a CWI meeting the minimum requirements specified in AWS D1.1, Section 6.
3. Additionally, 25% of full penetration welds shall be tested by ultrasonic testing in accordance with ASTM E164 and AWS D1.8
4. Additionally, 100% of welds in moment connections shall be tested by ultrasonic testing in accordance with ASTM E164.

5. Additionally, 100% of welds in column splice connections shall be tested by ultrasonic testing in accordance with ASTM E164.

B. High-Strength Bolting Tests and Inspections

1. All high strength bolts ASTM F3125 shall be manufactured, installed, and field tested in accordance with the “Specification for Structural Joints using High Strength Bolts” by RCSC, latest edition.
2. It is the responsibility of the Erector to comply with the minimum requirements of the RCSC for visual inspections.

1.7 CONTRACTOR'S ENGINEERING SERVICES

A. General: Where engineering services are required herein and excluded from EOR’s contract, the Contractor shall retain a Professional Civil or Structural Engineer, referred to herein as the Contractor's Engineer. Documents prepared by the Contractor's Engineer shall be stamped and signed by a Professional Engineer licensed in the state where the project is located.

B. The steel structure is a non-self-supporting steel frame and is dependent upon diaphragm action of the roof for stability and for resistance to wind and seismic forces. Provide all temporary supports required for stability and for resistance to wind and seismic forces until these elements are complete and are capable of providing this support. All temporary shoring and bracing during erection is the responsibility of the Erector and Contractor.

C. The Fabricator shall be responsible for the design and adequacy of all connections that are not designed or fully detailed on the Contract Documents. Shop Drawings, depicting the configuration and fabrication details, along with calculations signed and sealed by a Registered Professional Engineer working for the Fabricator licensed to practice in the state in which the project is located, shall be submitted to the structural Engineer of Record for review. Delegated design connections include, but are not limited to, moment connections shown on plans and column splices as requested by Erector.

1. All beam to column moment connections shall be designed for the minimum service reaction indicated on plans in combination with a 10 kip axial force (acting in both tension and compression).

D. Metal stairs shown on plans are for illustrative purposes only. The Fabricator shall be responsible for the design of metal stairs. Shop Drawings, depicting the configuration, connection, and fabrication details, along with calculations signed and sealed by a Registered Professional Engineer working for the Fabricator licensed to practice in the state in which the project is located, shall be submitted to the structural Engineer of Record for review of design intent.

E. Alternate connection details may be used if such details are submitted to the engineer for review and approval. However, the engineer shall be the sole judge of acceptance and the Contractor’s bid shall anticipate the use of those details shown on the drawings. The

Contractor is responsible for the design of such alternate details which they propose and provide stamped drawings for approval.

F. All handrails shall be designed per IBC Chapter 16 including a 200 lb concentrated point load and, in public spaces, a 50 pound per linear foot line load. See Chapter 16 for all design requirements for handrails. Signed and sealed calculations by an Engineer licensed in the State where the project is located shall be provided by the Fabricator.

G. All vehicle barriers shall be designed per IBC Chapter 16 including a 6000 lb concentrated point load. See Chapter 16 for all design requirements for vehicle barriers. Signed and sealed calculations by an Engineer licensed in the State where the project is located shall be provided by the Fabricator.

1.8 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on the Shop Drawings.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Structural Steel Members: A992 for rolled wide flange shapes and, for other rolled shapes and plate.

B. Plate, bars and channels: ASTM A36 unless otherwise noted on the drawings. Plates 2 inch thick and greater shall have Charpy V-Notch toughness of 20 ft-lb at 70 degrees F tested at any location permitted by ASTM A673.

C. Structural Tubing: ASTM A500, Grade B. Structural tubing shall be new and contain a minimum of 75 percent recycled post consumer steel.

D. Pipe: ASTM A53, Type E or S, Grade B. Pipe shall be new and contain a minimum of 75 percent recycled post consumer steel and not more than 0.05 percent sulphur.

E. Shear Stud Connectors: ASTM A108, Grades 1010 through 1020 inclusive. Connectors shall be free of defects, cracks or bursts deeper than half the thickness from the periphery of the head to the shaft. After welding, studs will be the length shown on the drawings.

F. Threaded Stud Connectors: Threaded studs in structural steel connections shall be reduced base studs conforming to ASTM A108, Grades 1010 through 1020 inclusive. After welding, studs will be the length shown on the drawings.

G. Bolts and Nuts: Bolts in structural steel connections shall be ASTM F3125 Grade A325, Type I unless designated as Grade A490 on the drawings. Nuts shall be ASTM A563 Grade C or DH. Patented, high strength steel connectors conforming to ASTM F1852 must be submitted for approval by the Architect and will not be permitted at slip critical bolted connections. Where galvanized connectors are called for on the drawings, they shall be galvanized in accordance

with ASTM A153. Bolts conforming ASTM A307 and nuts conforming to ASTM A563 may be used in stair, handrail, miscellaneous steel and timber connections.

H. Washers shall be flat and either circular, square or rectangular conforming to ASTM F436 Type 1. The finish of washers is to match the nut. Grade A325 bolts shall have washers under the head and Grade A490 bolts shall have hardened washers under the head and the nut.

I. Threaded Anchor Rods: ASTM F1554 36-ksi yield strength, unless otherwise designated on the drawings.

1. Finish: Hot dip zinc coating.
2. Grout: Nonmetallic, shrinkage resistant, non-corrosive, non-staining, factory-packaged complying with ASTM C1107.

J. Welding Materials: Filler metals shall conform to Table 4.1 of AWS D1.1. Electrodes and equipment settings shall be as recommended by the filler metal manufacturer for the position, thickness and conditions of use. electrodes and filler metal shall be low hydrogen types. FCAW wire diameter shall not exceed the values in Section 4.14.1 of AWS D1.1.

K. Sliding Bearing Plates: Teflon coated.

L. Touch-up Primer for Galvanized Surfaces: Zinc rich type.

2.2 CONNECTIONS

A. Unless otherwise noted on the drawings, shop connections shall be welded and field connections, except moment connections, shall be bolted. Weld only in accordance with approved welding procedures.

B. Unless otherwise noted on the drawings, every weld shall develop the full strength of the lesser of the members it joins.

C. All butt, groove, or bevel welds shall be complete, full penetration.

D. Welding electrodes shall be E70XX for manual arc welding and F7X-EXXX for submerged arc welding.

E. Minimum weld size shall be 3/16” unless noted otherwise.

F. Unless otherwise noted on the drawings, bolted connections shall be 3/4-inch diameter F3125 Grade A325; connections shall have a minimum of two bolts. Shoulder bolts with hex nut and lock washers shall be used in slotted connections with the washer covering the slot in positions. Bolts shall be assumed snug-tightened unless noted otherwise.

G. Oversize holes shall not be allowed without approval of the EOR. If oversize holes are elected and approved, bolts shall be slip-critical.

H. Unless connections are detailed on the drawings, the Contractor is responsible for the design of connections and shall submit stamped Shop Drawings, by an Engineer licensed in Louisiana, for review.

I. All elements of a connection shall be designed to resist the loads and moments shown on the drawings; if the reaction or load is not shown on the drawings, connections are to be designed as follows:

1. Beam connections are to be designed to resist one half the allowable load for the appropriate span given in the Tables 3-6 through 3-9 in the AISC Manual of Steel Construction. Beam connections will be in accordance with the AISC Manual of Steel Construction. The minimum connection angle length will be half the depth of the beam depth.
2. Horizontal and vertical bracing connections shall have a minimum of two bolts.

J. All connections shall be symmetrical about the axis of the member connected. Provide only one grade of bolt for each bolt diameter to be used in the connections. Do not mix grades of bolts.

K. Gusset plates connecting horizontal and vertical bracing to beams and/or columns shall be connected to both adjacent members; where this is not practical, provision shall be made for the moment induced by the eccentricity of the load to the work point of the connection. Gusset plates for horizontal bracing shall be located within the top two rows of bolts of beam connection angles, unless otherwise noted on the drawings. The minimum thickness of gusset plates in single shear shall be 5/16-inch for bolts in single shear and 3/8-inch for bolts in double shear.

L. Oversize holes for anchor bolts may be used with field welded washer plates. Anchor bolts for each column shall be furnished with a 1/8 thick sheet metal template.

M. Dissimilar metals shall be treated or properly separated to prevent galvanic and/or corrosive effects.

N. Where possible, all bolt holes in structural steel shall be drilled or punched in the shop. Any holes required to be made at the project site shall be mechanically drilled or punched. No burning of holes shall be allowed.

2.3 FABRICATION

A. Fabricate structural steel in accordance with the applicable provisions of the AISC Specifications for Structural Steel Buildings. Where practical, fabricate and assemble in the shop.

B. Obtain field measurements necessary for steel fabrication.

C. Perform high strength shop bolting in accordance with the appropriate ASTM specification. Complete high strength shop bolting before welding.

D. Dimensional tolerances:

E. Overall length of members with both ends milled may vary by 1/32-inch.

F. Overall length of members without milled ends may vary by 1/16-inch for lengths less than 30 feet and 1/8-inch for lengths 30 feet and over.

G. Where structural joints are welded, the detail of the joints, welding technique, weld quality and appearance, and methods for correcting defective welds shall conform to the AISC Code of Standard Practice and AWS D1.1. Welding procedure and sequence shall conform to AWS B2.1. Surfaces to be welded shall be clean and free of rust, paint, or galvanizing. Burned or flame cut edges shall be chipped clean and wire brushed.

H. Where milling is indicated on the drawings, the contact surfaces shall be machined true to obtain full and complete contact.

I. Structural members are selected from generally available rolled sections; however, if the specified sections are not available, the Contractor shall provide sections with equivalent physical properties after approval by and at no additional cost to the Architect.

J. Shear studs shall not be installed in the shop.

K. All steel shall be painted with shop standard primer unless noted otherwise.

L. Splices in structural steel not shown on the structural drawings will not be accepted without specific approval of the Structural Engineer. Submitted splices shall be designed the Fabricator's delegated design engineer and stamped by an Engineer licensed in Louisiana.

M. The General Contractor and Steel Erector shall notify the Architect of any fabrication or erection errors or deviations and receive written approval before any field corrections are made.

2.4 FINISH

A. Shop prime structural steel members unless noted otherwise. Apply two coats of different colored primer to areas which will be inaccessible after erection or assembly. Do not prime surfaces that will be fireproofed, galvanized, fully embedded in concrete or mortar, within 3 inches of field welds, or on the faying surface of high strength bolted friction connections.

1. Lead and chromate free, non-asphaltic, rust-inhibiting primer complying w/ MPI #79 and compatible w/ any top coat.
2. SSPC-SP2 surface preparation or better.
3. Extend briming of partially embedded member minimum 2in.

B. Galvanize structural steel members indicated on the Drawings as galvanized in accordance with ASTM A123 and A385 after fabrication. Prepare galvanized surfaces to be painted in

accordance with ASTM D2092 and shop coat with a compatible primer. Repair damaged galvanizing in accordance with ASTM A780.

PART 3 - EXECUTION

3.1 PREPARATION

A. Provide anchor bolts and other items embedded in concrete.

B. Furnish and install temporary supports and internal braces necessary to support structural steel during erection. Temporary supports and braces shall be adequate for anticipated wind, seismic, equipment and erection loads. Remove temporary shoring after the steel erection is complete.

C. After completion of welds, remove weld tabs (spillage dams) in accordance with AWS D1.1 provision for dynamically loaded structures. After completion of full penetration groove welds, remove backing bars in accordance with AWS D1.1 provision for dynamically loaded structures, inspect the weld and reinforce the groove weld with a fillet weld. Peening of thick welds shall be performed in accordance with AWS D1.1.

3.2 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Beginning of installation means Contractor accepts that existing conditions meet the requirements for installation.

C. The General Contractor and/or Steel Erector shall notify the Architect of any fabrication or erection errors or deviations and receive written approval before any field corrections are made.

3.3 ERECTION

A. Erect structural steel in accordance with the AISC Specifications for Structural Steel Buildings, except as modified herein. Where members cannot be properly assembled due to mis-fabrication or deformation due to handling or transportation, the condition shall be reported to the Architect with a proposed method of correction for approval.

B. During erection beams and vertical bracing are to be secured with at least two bolts prior to releasing the hoisting cable.

C. Allow for erection loads, and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.

D. Perform high strength bolting in accordance with the appropriate ASTM specification. Complete high strength bolting before field welding.

E. Do not field cut or alter structural members without approval of the Architect.

F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

G. Grout base plates with non-shrink grout. Clean concrete bearing surfaces from bond-reducing materials, and roughen if necessary to improve bond to surfaces. Clean the bottom surface of base plate. Set base plate on wedges or other adjustable devices. After the base plate has been positioned and plumbed, tighten the anchor bolts. Pack grout solidly between the bearing surfaces to ensure that no voids remain complying with manufacturer's instructions for non-shrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

H. Where field welding to existing structural members is required, the Contractor shall confirm the weldability of the existing steel by cutting or drilling samples and having them tested by the Contractor's Independent Testing Laboratory. The testing laboratory shall recommend the location for taking samples, provide a report on weldability, recommend the type of electrode and weld and inspect the final welds. The Contractor will be responsible for preparing the existing steel for welding and touch of the surfaces. Use low hydrogen electrodes when welding to existing steel.

I. Existing framing requiring welding shall be thoroughly cleaned to ensure proper welding.

J. Provide temporary shoring when welding to existing steel.

K. Use low-hydrogen electrodes when welding to existing steel.

L. Field welded surfaces within 4 inches of weld shall be cleaned and ground smooth. After welding, coat the exposed area with appropriate primer/paints as specified.

M. Main support members for the metal deck are shown. During preparation, submission, and review of shop drawings, any additional angles or miscellaneous attachment details required to support the metal deck at the required elevation shall be provided by the Structural Steel Contractor.

N. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

O. Structural elements shall be fabricated and assembled in the shop to the greatest extent possible. All field connections shall be bolted unless shown otherwise on the structural drawings.

P. No flame cutting or enlarging will be allowed without specific approval of the Structural Engineer.

3.4 ERECTION TOLERANCES

A. Tolerances shall be in accordance with the AISC Code of Standard Practice. Crane rail tolerances shall comply with CMAA Specification 70.

END OF SECTION

SECTION 05 3100

STEEL DECK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof deck.

2. Metal form deck.

3. Supplementary framing for openings up to and including 18 inches.

1. Bearing plates and angles.

B. Related requirements:

1. Section 03 30 00 - Cast-in-Place Concrete: Concrete topping over metal deck.

2. Section 05 12 00 - Structural Steel: Support framing for openings larger than 18 inches.

3. Section 05 21 00 - Steel Joists: Support framing for openings larger than 18 inches.

1.2 REFERENCES

A. ASTM International:

1. ASTM A 36/A 36M -Specification for Carbon Structural Steel; latest edition

2. ASTM A108. Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished; latest edition

3. ASTM A 123/A 123M -Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel. Products; latest edition

4. ASTM A 653/A 653M -Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; latest edition

5. ASTM A 1008/A 1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength, Low Alloy, and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardened; latest edition

B. AWS:

1. AWS D1.1/D1.1M -Structural Welding Code - Steel; American Welding Society; 2010.

2. AWS D1.3 -Structural Welding Code - Sheet Steel; American Welding Society; 2008.

C. Other Standards:

1. FM P7825 -Approval Guide; Factory Mutual Research Corporation; current edition.

2. SDI (DM) -Publication No.31, Design Manual for Composite Decks, Form Decks, Roof Decks; Steel Deck Institute; 2007.

3. SSPC-Paint 20 -Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); The Society for Protective Coatings; 2002 (Ed. 2004).

4. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.3 SUBMITTALS

A. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, and accessories.

B. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.

C. Submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the work of this Section with minimum 5 years of experience.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Cut plastic wrap to encourage ventilation.

B. Separate sheets and store deck on dry wood sleepers; slope for positive drainage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Steel Deck:

1. Nucor-Vulcraft Group: www.vulcraft.com.

2.2 STEEL DECK

A. Roof Deck: See Design Drawings.

B. Metal Form Deck: See Design Drawings.

C. Metal Composite Deck: See Design Drawings.

D. Accessory Materials:

1. Bearing Plates and Angles: ASTM A36/A36M steel, unfinished.
2. Welding Materials: AWS D1.1.
3. Fasteners: Galvanized hardened steel, See Structural General Notes.
4. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing conditions prior to beginning work.

3.2 INSTALLATION

A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level.

B. Fasten deck to structural steel framing in accordance with the Design Drawings.

C. On wood surfaces provide minimum 4 inch bearing.

D. At mechanically fastened male/female side laps and end laps, fasten as per the structural drawings.

E. At deck openings from 6 inches to 18 inches in size, provide minimum 3 x 3 x 1/4 inch steel angle reinforcement. Place angles perpendicular to flutes; extend minimum two flutes beyond each side of opening and mechanically attach to deck at each flute.

F. At floor edges, install concrete stops upturned to top surface of slab, to contain wet concrete. Provide stops of sufficient strength to remain stationary without distortion.

G. At openings between deck and walls, columns, and openings, provide sheet steel closures and angle flashings to close openings.

H. Position roof drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.

END OF SECTION

SECTION 05 4000

COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Structural load bearing metal framing, exterior and interior applications.

B. Interior non-structural, load-bearing metal framing that exceeds manufacturer standard height and load limitations of standard, non-structural metal framing.

C. Refer to Section 09 2216 - Non-Structural Metal Framing, for interior non-structural, non-load-bearing metal framing that does not exceed height and load limitations of standard, non-structural metal framing.

1.03 RELATED REQUIREMENTS

A. Refer to 05 5400 - Cold-Formed Metal Framing, for structural non-load-bearing metal framing that does not exceed height and load limitations of standard, nonstructural metal framing.

B. Refer to Section 05 5000 - Metal Fabrications, for miscellaneous steel shapes, masonry shelf angles, and connections used with cold-formed metal framing.

C. Refer to Section 09 2216 - Non-Structural Metal Framing for the following:

1. Exterior non-structural, load bearing metal framing.
2. Interior non-structural, load bearing and non-load bearing metal framing.
3. Interior non-structural metal framing that does not exceed manufacturer standard height or load limitations of standard, non-structural metal framing.

D. Refer to Section 05 4000 - Cold Formed Metal Framing.

1. Structural load bearing metal framing, exterior and interior applications.
2. Interior non-structural, load-bearing metal framing that exceeds manufacturer standard height and load limitations of standard, non-structural metal framing.

E. For exterior wall system gypsum board sheathing refer to Section 06 1645.

1.04 **REFERENCES**

A. Definitions:

1. Structural Metal Framing: Metal framing intended to support building structural loads at interior and exterior locations in addition to gypsum, wood, or other sheathing boards.
2. Load Bearing Metal Framing: Metal framing intended to support non-structural loads in addition to gypsum, wood, or other sheathing boards including, but not limited to, wall or ceiling mounted items.
3. Non-Load Bearing Metal Framing: Metal framing intended to support only gypsum, wood, or other sheathing boards.
4. Metal Framing: Miscellaneous cold formed steel framing shapes used for support of wall and ceiling assemblies.
5. Sheathing: Boards used as final wall cladding material to be field finished, or as substrate for wall coverings.

B. Reference Standards:

1. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute.
2. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
3. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
4. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
5. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
6. ASTM C955 - Standard Specification for Cold-Formed Steel Structural Framing Members.
7. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories.
8. AWS D1.1/D1.1M - Structural Welding Code - Steel.
9. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel.
10. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer.
11. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic").

1.05 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

1. Coordinate with work of other sections that is to be installed in or adjacent to the metal framing system, including but not limited to structural anchors, cladding anchors, utilities, insulation, and firestopping.

B. Attendees shall include contractor, cold formed metal framing installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.06 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data:

1. Provide data on standard framing members; describe materials and finish, product criteria, limitations.
2. Provide manufacturer's data on factory-made framing connectors, showing compliance with requirements.

C. Shop Drawings:

1. Provide Shop Drawings prepared by cold-formed steel framing manufacturer.
2. Include floor plans at minimum 1/8 inch per foor scale showing location of each partition and framing items, keyed to detals provided. Provide larger scale as needed for clarity.
3. Include details and sections at minimum 1 inch per foor scale. Provide larger scale as needed for clarity.
4. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
5. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
6. Indicate loading, welds, and type and location of fasteners, and accessories or items required of related work.
7. Indicate each fastener/anchor type proposed for use at each type of project substrate. Provide evidence of suitability of each fastener for each substrate including at high compressive strength post-tensioned concrete locations where cold formed metal framing is installed. Fasteners/anchors at post-tensioned concrete locations shall be as acceptable to project structural engineer.

D. Delegated-Design, Structural Load Bearing Framing: Provide shop drawings signed and sealed by a professional structural engineer. Calculations for loadings and stresses of framing, signed and sealed by a professional structural engineer.

1. Locate each framing item on floor plans, details, and sections provided in Shop Drawings. Clearly differentiate between each metal framing assembly proposed for use on Project including those provided under other Sections.

E. Delegated-Design, Non-Structural, Load Bearing Framing (exceeding manufacturer standard framing height and load limitations in project specific applications): Provide shop drawings

signed and sealed by a professional structural engineer. Calculations for loadings and stresses of framing, signed and sealed by a professional structural engineer.

1. Locate each framing item on floor plans, details, and sections provided in Shop Drawings. Clearly differentiate between each metal framing assembly proposed for use on Project including those provided under other Sections.

F. Manufacturer's Installation Instructions.

G. Designer's Qualification Statement: Written statement of designer qualifications.

H. Manufacturer's Qualification Statement: Written statement of designer qualifications.

I. Qualification Data: For testing agency.

J. Welding certificates.

K. Product Certificates: For each type of code-compliance certification for studs and tracks.

L. Product Test Reports: For each listed product, for tests performed by manufacturer and witnessed by a qualified testing agency.

1. Steel sheet.
2. Expansion anchors.
3. Power-actuated anchors.
4. Mechanical fasteners.
5. Vertical deflection clips.
6. Horizontal drift deflection clips
7. Miscellaneous structural clips and accessories.

M. Research Reports:

1. For cold-formed steel framing from a qualified testing agency acceptable to authorities having jurisdiction.
2. Steel framing manufacturer to have a third-party evaluation report for its products that are reviewed to applicable project codes and AISI S100.
3. For sill sealer gasket/termite barrier, showing compliance with ICC-ES AC380.

1.07 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements. manufacturer.

1.08 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this Section, and with minimum 15 years of documented experience.

1. Member in good standing of the Steel Framing Industry Association (SFIA).

2. Products to be certified under an independent third-party inspection program administered by an agency accredited by IAS to ICC-ES AC98 IAS Accreditation Criteria for Inspection Agencies.

B. Installer Qualifications: Company specializing in performing the work of this Section with minimum 5 years documented experience.

C. Delegated-Design Requirement: Preparation of Shop Drawings, design calculations, and other structural data shall be completed by a qualified professional engineer.

1. Design framing system under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of Louisiana.

2. Professional Engineer Qualifications: A professional engineer who is licensed in the State of Louisiana and who is experienced in providing engineering services of the kind indicated for installations of cold-formed steel framing that are similar to those indicated for this Project in material, design, and extent.

D. Testing Agency Qualifications: Qualified in accordance with ASTM E329 for testing indicated.

E. Product Tests: Mill certificates or data from a qualified independent testing agency, indicating steel sheet complies with requirements, including base-steel thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

F. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified in accordance with the product-certification program of the Steel Framing Industry Association (SFIA).

G. Welding Qualifications: Qualify procedures and personnel in accordance with the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

H. Fire-Test-Response Characteristics: Where indicated, provide cold-formed steel framing identical to that of assemblies tested for fire resistance per ASTM E119 by, and displaying a classification label from, a testing and inspecting agency acceptable to authorities having jurisdiction.

I. Comply with the following AISI specifications and standards:

1. AISI S100, "North American Specification for the Design of Cold-Formed Steel Structural Members."

2. AISI S200, "North American Standard for Cold-Formed Steel Framing - General Provisions."

3. AISI S201, "North American Standard for Cold-Formed Steel Framing - Product Standard."

4. AISI S202, "Code of Standard Practice for Cold-Formed Steel Structural Framing."

5. AISI S240, "North American Standard for Cold-Formed Steel Structural Framing."

1.09 DELIVERY, STORAGE, AND HANDLING

A. Protect and store cold-formed steel framing from corrosion, moisture staining, deformation, and other damage during delivery, storage, and handling as required in AISI S202.

B. Store materials to permit easy access for inspection and identification.

C. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers.

D. Protect steel members and packaged materials from corrosion and deterioration.

E. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures.

1.10 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this section.

1. Warranty Period: One year from date of Substantial Completion.

B. Special Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, where items fail to perform as designed and manufactured.

1. Warranty Period: Provide manufacturer standard warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: ClarkDietrich Building Systems. www.clarkdietrich.com.

B. Acceptable Manufacturers: Subject to compliance with requirements.

1. CEMCO. www.cemcosteel.com.
2. ClarkDietrich Building Systems. www.clarkdietrich.com.
3. Jaimes Industries. www.jaimesind.com.
4. Marino. www.marinoware.com.
5. Nuconsteel, A Nucor Company.
6. R-stud, LLC. www.rstud.com.
7. SCAFCO Corporation. www.scafco.com.
8. Steel Construction Systems. www.steelconsystems.com.
9. The Steel Network, Inc. www.SteelNetwork.com.
10. United Steel Deck, Inc. www.unitedsteel.com

C. Provide cold formed metal framing, components, and accessories from a single manufacturer unless indicated otherwise.

2.02 PERFORMANCE REQUIREMENTS

A. Delegated-Design: Engage a qualified professional engineer, licensed in the State of Louisiana to design cold-formed steel framing system to meet the project requirements. For configurations within manufacturer standard height and load limits, provide evidence of Delegated-Design and/or third party testing certifying compliance with project specific requirements.

1. Provide cold-formed steel framing within limits and conditions indicated.
    a. Design Loads: As indicated on Drawings and as required by applicable code.
    b. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F (67 deg C).
    c. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure.
    d. Design wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials to horizontal deflection performance.
    e. Increase metal gages indicated in this Section as needed to provide adequate support for additional construction installed over, or supported by, framing systems. Coordinate with individual product, material, or system manufacturer recommendations.

B. Deflection Limits: Design framing systems to withstand design loads without deflections greater than as indicated. Include loads imposed by additional products, materials, equipment, or systems to be installed over, and supported by framing systems. Increase load requirements as required for additional items.

1. Exterior Applications:
    a. Exterior Load-Bearing Wall Framing: Minimum horizontal deflection of 1/600 of the wall height. Load shall be based on project exterior design requirements.
    b. Exterior Non-Load-Bearing Framing: Minimum horizontal deflection of 1/360 of the wall height. Load shall be based on project exterior design requirements.
2. Interior Applications:
    a. Interior Load-Bearing Wall Framing: Minimum horizontal deflection of 1/360 of the wall height under a horizontal load of 10 lbf/sq. ft.
    b. Interior Non-Load-Bearing Framing: Minimum horizontal deflection of 1/360 of the wall height under a horizontal load of 5 lbf/sq. ft.
3. Overhead Joist Framing: Minimum vertical deflection of 1/360 of the span for live loads and 1/240 for total loads of the span.

C. Cold-Formed Steel Framing Standards: Unless more stringent requirements are indicated, framing to comply with AISI S100 and AISI S200, S220, and S240.

D. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Refer to fire rated assembly requirements indicated on Drawings.
2. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency acceptable to applicable code officials.

E. Coordinate framing assemblies with items to be mounted or supported by the framing system. Provide increased structural performance for locations supporting more than wall sheathing materials.

2.03 COLD-FORMED STEEL FRAMING

A. General - Steel Sheet Materials: ASTM A1003/A1003M, Structural Grade, Type H, metallic coated, of grade and coating designation as follows:

1. Grade: Minimum structural grade 33. Provide increased grade as required for specific performance application.
2. Coating: G60 (Z180) or G90 (Z275). Chemically treated, not oiled.
3. Minimum Base-Metal Thickness for All Items: Provide 18 gage minimum.
    a. Provide thicker/heavier gage in locations where cladding or wall assembly to be installed over metal framing is recommended by the manufacturer of those products/assemblies to be heavier gage.
    b. Provide thicker/heavier gage in locations where indicated by Delegated-Design requirements.
    c. Provide thicker/heavier gage for framing items indicated in this Section.

B. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Flange Width: As indicated on drawings or as indicated by Delegated-Design requirements.

C. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and as follows:

1. Flange Width: 1-1/4 inches or as indicated by Delegated-Design requirements.
2. Minimum 1 inch depth.
3. Width as required to receive studs.

D. Deflection Clips and Tracks:

1. General:
    a. Minimum Base-Metal Thickness: 14 gage minimum.

b. Flange Width: As indicated on Drawings or as indicated by Delegated-Design requirements.

2. Vertical Deflection and Horizontal Standoff Clips: Manufacturer's standard bypass clips with horizontal standoff, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

3. Head-of-Wall Deflection Clips: Manufacturer's standard head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

4. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:

   a. Provide a flange width of 2-1/2" minimum. Track shall be same nominal depth as studs with allowance for deflection of standard deep leg track.

5. Single Deflection and Firestop Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal and lateral loads and transfer them to the primary structure

6. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.

   a. Provide a flange width of 2-1/2" minimum. Track shall be same nominal depth as studs with allowance for deflection of standard deep leg track.

7. Slotted Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; punched with vertical slots in both legs. Studs should be positively attached to deep-leg track using vertical slots while allowing free vertical movement. Legs designed to support horizontal and lateral loads and transfer them to the primary structure

E. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

F. Purlins and Girts: Structural Grade 230 minimum, Type L.

G. Joists: Size, gauge, spacing and anchorage of joists shall be as qualified by design, and as indicated on approved shop drawings. Coordinate with Delegated-Design requirements.

1. Components shall be unpunched and continuous without splicing.

H. Headers and Jambs - Heavy-Duty Stud: Manufacturer's proprietary shape used to form header beams and jambs, columns or posts, of web depths indicated, unpunched, with stiffened flanges and as follows:

I. Steel Joists: Manufacturer's standard C-shaped steel joists, of web depths indicated, unpunched, and continuous without splicing, with stiffened flanges, and as follows:

1. Flange Width: As indicated on drawings or as indicated by Delegated-Design requirements.

J. U-Channel Assembly: Manufacturer's standard-length U-channel for lateral bracing for exterior curtain-wall framing.

K. Firestop Track: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

2.04 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from ASTM A1003/A1003M, Structural Grade, Type H, metallic coated steel sheet, of same grade and coating designation used for framing members. Thickness and configuration shall be accordance with specified requirements.

B. Accessories, include but are not limited to the following, as applicable.

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. Anchor clips.
5. End clips.
6. Foundation clips.
7. Gusset plates.
8. Stud kickers and knee braces.
9. Joist hangers and end closures.
10. Hole-reinforcing plates.
11. Backer plates.

2.05 ANCHORS, CLIPS, AND FASTENERS

A. General: Fastener/anchor shall of type suitable for substrate. Evidence of suitability is required for each fastener/anchor, for each substrate including at high compressive strength post-tensioned concrete locations where cold formed metal framing is installed.

B. Steel Shapes and Clips: ASTM A36/A36M, zinc coated by hot-dip process according to ASTM A123/A123M.

C. Anchor Bolts: ASTM F1554. Zinc coated by hot-dip process in accordance with ASTM A153/A153M, Class C.

D. Post-Installed Anchors: Fastener systems with bolts of same basic metal as fastened metal, if visible, unless otherwise indicated; with working capacity greater than or equal to the design

load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, ICC-ES AC193, ICC-ES AC58, or ICC-ES AC308 as appropriate for the substrate.

1. Material for Dry Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941 (ASTM F1941M), Class Fe/Zn 5, unless otherwise indicated.
2. Material for Exterior or Interior Wet Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1, type 304) or Group 2 (A4, type 316) stainless steel bolts, ASTM F593, and nuts, ASTM F594.

E. Power-Actuated Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

F. Mechanical Fasteners: ASTM C1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.

1. Head Type: Low-profile head beneath sheathing; manufacturer's standard elsewhere.

G. Welding Electrodes: Comply with AWS standards.

2.06 GROUT AND ANCHORING CEMENT

A. Exterior and Wet Area Non-shrink, Nonmetallic Grout: Premixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with ASTM C1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

B. Interior Dry Area Anchoring Cement: Factory-packaged, non-shrink, non-staining, hydraulic-controlled expansion cement formulation for mixing with water at project site to create pourable anchoring, patching and grouting compound. Use for interior application only.

C. Coordinate grout and anchoring cement with project structural requirements and applicable Delegated-Design requirements. Notify project structural engineer of conflicts. Where conflict exists, the more stringent requirement shall apply.

2.07 SILL TRACK SEALER GASKETS FOR METAL STUD FRAMING

A. For use where metal stud wall framing sill directly abuts concrete. Installation shall be continuous.

B. Interior Wall - Sill Track Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members as required.

1. Basis of Design: Protecto Energy Plate Liner by Protecto Wrap, www.protectowrap.com

C. Exterior Wall Sill Sealer Gasket: 3/8 inch thick closed cell polyethylene foam with self-adhering waterproof coating on one side. Width of wall studs and sole plate.

1. Basis of Design: Premium Energy Sill Sealer by Protecto Wrap, www.protectowrap.com

2.08 ACCESSORY MATERIALS

A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.

B. Galvanizing Repair Paint: ASTM A780/A780M.

C. Shims: Load-bearing, high-density, multimonomer, nonleaching plastic; or cold-formed steel of same grade and metallic coating as framing members supported by shims.

D. Grommets: Provide protective grommets recommended by metal framing manufacturer for electrical wire and plumbing pipe passage through metal framing members.

E. Bituminous Paint/Coating: Refer to Section 07 1115 - Protective Bituminous Paint Coating.

1. Coordinate with requirements of product/material manufacturer(s) of this Section and of adjacent products/materials.
2. For use as corrosion protection between dissimilar materials.
3. Apply in two coats for full coverage minimum 30 dry mil thickness, unless indicated otherwise.

2.09 WALL SHEATHING

A. Refer to Section 09 2116 - Gypsum Board Assemblies.

B. Refer to Section 06 1645 - Exterior Gypsum Sheathing.

2.10 FABRICATION

A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.

1. Fabricate framing assemblies using jigs or templates.
2. Cut framing members by sawing or shearing; do not torch cut.
3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
    a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    b. Locate mechanical fasteners and install according to Shop Drawings, with screws penetrating joined members by no fewer than three exposed screw threads.
4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies by means that prevent damage or permanent distortion.

C. Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable variation of 1/8 inch in 10 feet (1:960) and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, conditions, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 PREPARATION

A. Coordinate with installation of fire-resistive materials applied to structural materials adjacent to or in contact with metal framing material's.

B. Install shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch (6 mm) to ensure a uniform bearing surface on supporting concrete or masonry construction.

C. Install sill sealer gaskets at the underside of wall bottom tracks or rim tracks and at the top of wall metal framing locations.

3.03 INSTALLATION, GENERAL

A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed steel framing according to AISI S200, AISI S202, and manufacturer's written instructions unless more stringent requirements are indicated.

C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.

1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch (1.6 mm).

D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.

1. Cut framing members by sawing or shearing; do not torch cut.
2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
    a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    b. Locate mechanical fasteners, install according to Shop Drawings, and comply with requirements for spacing, edge distances, and screw penetration.

E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.

F. Install temporary bracing and supports to secure framing and support loads equal to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.

H. Install sound control or thermal control insulation as specified in other sections. Coordinate installation with locations that are inaccessible on completion of metal framing work.

I. Fasten hole-reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

J. Set items plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.

K. Align studs vertically where floor framing interrupts wall-framing continuity. Where studs cannot be aligned, continuously reinforce track to transfer loads.

L. Align floor and roof framing over studs in accordance with AISI S200, Section C1. Where framing cannot be aligned, continuously reinforce track to transfer loads.

M. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure.

N. Cutting:
1. Cutting for utilities: Do not remove, notch, cut or relocate load-bearing studs or other structural members for utility installation or other cause without prior approval of Architect.
2. Cut-outs: Minimize cut-outs for utilities and bridging. Locate cut-outs near bottom, but not less than 12 inches from bottom track. No cut-outs allowed at mid-points or tie points.
3. Perform cutting with a power-driven saw with an abrasive blade. No hand cutting will be permitted. Cuts shall be clean, accurate and true to line.

O. Attachment: Secure abutting and intersecting members using methods indicated by Delegated-Design. Where not indicated, the following shall apply:

1. Secure 18 gage and lighter members using screws. Secure 16 gage and heavier by welding.
2. Screws: Comply with screw manufacturer's product data and ASTM C954 for minimum spacing and edge distance requirements and for torque requirements.
    a. Screw penetration through joined materials shall be minimum of three exposed screw threads.
3. Welding:
    a. Welds shall develop 1,000 psi minimum strength to structural framing, 500 psi minimum strength to other cold-formed metal framing components; comply with AWS methods and requirements.
    b. Weld only 16 gauge and heavier members directly to structural framing; weld 18 gauge and lighter members to 16 gauge or heavier clips, then weld clips to structural framing.
    c. Weld to adjacent steel construction whenever possible.
    d. Screw or bolt to dissimilar construction and where welding is not possible or feasible.

P. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.

Q. Install miscellaneous framing and connections, including but not limited to stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system complying with specified requirements.

3.04 ERECTION TOLERANCES

A. Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows.

B. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.05 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

3.06 FIELD QUALITY CONTROL

A. Testing: Contractor shall engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field and shop welds will be subject to testing and inspecting.

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Tests and Inspections:

1. Cold-formed steel framing will be considered defective if it does not pass tests and inspections.

2. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.07 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 05 5000

METAL FABRICATIONS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Fabricated metal items as indicated.
   1. Steel framing and supports for the following:
      a. Overhead hung, ceiling-hung or overhead supported items.
      b. Operable partitions.
      c. Low partitions.
      d. Equipment.
      e. Concealed steel supports.
   2. Miscellaneous exterior metal components.
      a. Shelf angles.
      b. Loose Lintels.
      c. Loose bearing and leveling plates for applications where they are not specified in other Sections.
      d. Miscellaneous items.
   3. Steel framing and supports for applications where framing and supports are not specified in other Sections.
   4. For structural items refer to project Structural Drawings and Specifications.

B. Products Furnished But Not Installed Under This Section:
   1. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
   2. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.

2. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

B. Preinstallation Conference:

1. Preinstallation Conference: Conduct meeting minimum two weeks prior to starting work of this Section, requiring attendance of all trades affected by the Work of this Section.
2. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.04 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: For all shop fabricated items and as follows.

1. Metal components and fabrications of this Section.
2. Fasteners and anchors.
3. Shop primers.
4. Shrinkage-resisting grout.
5. Other fabrications required for support or installation of specified items.
6. Components for special fabrications of this Section.

C. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

1. Provide plan drawings indicating location of each item.
2. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

D. Delegated-Design Submittal: Analysis data signed and sealed by the qualified professional engineer responsible for their preparation. Provide submittal for the following items:

1. Indication of compliance with specified Design Requirements article, signed and sealed by a professional structural engineer including calculations.
2. Metal support and framing for:
   a. Equipment.
   b. Overhead or ceiling supported items.

E. Delegated-Designer Qualification Data: For professional engineer's experience with providing Delegated-Design engineering services of the kind indicated, including documentation that engineer is licensed in the State of Louisiana.

F. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

G. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

1.05 QUALITY ASSURANCE

A. Delegated-Design: Design indicated metal fabrications under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of Louisiana.

1. Fabricated items shall comply with requirements of applicable codes.
2. Include complete design of each item or assembly including materials, securement and anchorage, substrate requirements, and finishing requirements.

B. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

C. Welding Qualifications: Qualify procedures and personnel in accordance with the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification.

1. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers.
2. Protect steel members and packaged materials from corrosion and deterioration.
3. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures.

B. Repair or replace damaged materials or structures as directed.

1.07 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 PRODUCTS

2.01 METAL JOINTING AND FINISH QUALITY LEVEL DESCRIPTIONS

A. General: All items of this Section are to be Architectural level, unless noted otherwise.

B. Architectural: All joints as inconspicuous as possible, whether welded or mechanical.

1. Welded Joints: Continuously welded and ground smooth and flush.
2. Mechanical Joints: Butted tight, flush, and hairline; concealed fastenings only.

3. Exposed Edges and Corners: Eased to small uniform radius. Exposed joints tight with face surfaces aligned.
4. Metal Surfaces to be Painted: Sanded or ground smooth, suitable for highest quality gloss finish.

2.02 MATERIALS - STEEL

A. Steel Sections: ASTM A36/A36M.

B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.

C. Plates: ASTM A283/A283M.

D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.

E. Slotted Channel Framing: ASTM A653/A653M, Grade 33.

F. Slotted Channel Fittings: ASTM A1011/A1011M.

G. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.

H. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.

I. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563 (ASTM A563M); and, where indicated, flat washers.

J. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

K. Anchors, General: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing in accordance with ASTM E488/E488M, conducted by a qualified independent testing agency.

1. Cast-in-Place Anchors in Concrete: Either threaded or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F2329/F2329M.

L. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

2.03 FABRICATION, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Thermal Movement: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

C. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

1. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
2. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
3. Form exposed work with accurate angles and surfaces and straight edges.
4. Continuously seal joined members by continuous welds.
5. Weld corners and seams continuously to comply with the following:
    a. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
    b. Obtain fusion without undercut or overlap.
    c. Remove welding flux immediately.
    d. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
6. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
7. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
8. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
9. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
10. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2- inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.
11. Fabricate items with joints tightly fitted and secured.

D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

E. Finish and joint quality shall be as indicated for each item.

2.04 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

1. Fabricate units from slotted channel framing where indicated.
2. Furnish inserts for units installed after concrete is placed.

C. Jointing and Finish Quality Level: Service, as described in this Section.

D. Provide metal support strapping for flashing/termination bar fastening.

E. Finish: As specified and in accordance with Section 09 9000 - Painting and Coating.

1. Exterior Items: Galvanize and prime.
2. Exposed Items: Prepare and prime as specified in Section 09 9000 - Painting and Coating. Field finish in color selected by Architect.
3. Concealed Items: Prepare and prime. No additional finish required.

2.05 OPERABLE PARTITION FRAMING AND SUPPORT

A. General: Fabricate supports for operable partitions from continuous steel beams of sizes indicated and as recommended by partition manufacturer with attached bearing plates, anchors, and braces as indicated and as recommended by partition manufacturer. --

1. Drill or punch bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.
2. Coordinate with project Structural design requirements.
3. Coordinate with project Delegated-Design requirements.
4. Furnish inserts for units installed after concrete is placed.

B. Jointing and Finish Quality Level: Service, as described in this Section.

C. Finish: As specified and in accordance with Section 09 9000 - Painting and Coating.

1. Exposed Items: Prepare and prime as specified in Section 09 9000 - Painting and Coating. Field finish in color selected by Architect.
2. Concealed Items: Prepare and prime. No additional finish required.

2.06 SHELF ANGLES

A. For Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of items as indicated. Coordinate with project Structural design requirements.

B. Fabricate shelf angles from steel angles of sizes indicated and for attachment to framing system. Provide horizontally slotted holes to receive 3/4-inch bolts, spaced not more than 6 inches from ends and 24 inches o.c., unless otherwise indicated.

1. Provide mitered and welded units at corners.
2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches larger than expansion or control joint.

C. For cavity walls, provide vertical channel brackets to support angles from backup structural system.

D. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in- place concrete.

E. Jointing and Finish Quality Level: Architectural, as described in this Section.

F. Finish: As specified and in accordance with Section 09 9000 - Painting and Coating.

1. Exterior Items: Galvanize and prime.
2. Exposed Items: Prepare and prime as specified in Section 09 9000 - Painting and Coating. Field finish in color selected by Architect.
3. Concealed Items: Prepare and prime. No additional finish required.

2.07 LOOSE BEARING AND LEVELING PLATES

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting. Coordinate with project Structural design requirements.

B. Jointing and Finish Quality Level: Service, as described in this Section.

C. Finish: As specified and in accordance with Section 09 9000 - Painting and Coating.

1. Exterior Items: Galvanize and prime.
2. Exposed Items: Prepare and prime as specified in Section 09 9000 - Painting and Coating. Field finish in color selected by Architect.
3. Concealed Items: Prepare and prime. No additional finish required.

2.08 STEEL WELD PLATES AND STEEL ANGLES

A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

1. Coordinate with project Structural design requirements.

B. Jointing and Finish Quality Level: Service, as described in this Section.

C. Where AESS is indicated, comply with requirements of Section 05 1213 - Architecturally Exposed Structural Steel.

D. Finish: As specified and in accordance with Section 09 9000 - Painting and Coating.

1. Exterior Items: Galvanize and prime.
2. Exposed Items: Prepare and prime as specified in Section 09 9000 - Painting and Coating. Field finish in color selected by Architect.
3. Concealed Items: Prepare and prime. No additional finish required.

2.09 GROUT AND ANCHORING CEMENT

A. Exterior and Wet Area Non-shrink, Nonmetallic Grout: Premixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

B. Interior Dry Area Anchoring Cement: Factory-packaged, non-shrink, non-staining, hydraulic-controlled expansion cement formulation for mixing with water at project site to create pourable anchoring, patching and grouting compound. Use for interior application only.

C. Coordinate grout and anchoring cement with project structural requirements and applicable Delegated-Design requirements. Notify project structural engineer of conflicts. Where conflict exists, the more stringent requirement shall apply.

2.10 FINISHES - STEEL

A. Galvanizing: Hot dip galvanize items as follows.

1. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft (530 g/sq m) galvanized coating.
2. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

B. Prime paint steel items.

1. Exceptions: Galvanize items to be embedded in concrete and items to be embedded in masonry. Coat with bituminous coating after galvanizing.
2. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.

C. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean galvanized surfaces of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.

1. Prepare surfaces to be primed in accordance with SSPC-SP2.

D. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.

1. Shop prime with primers specified in Section 09 9000 - Painting and Coating, unless zinc- rich primer is indicated.

2. Prime Painting: Two coats, minimum.

E. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:

1. Indicated to Receive Primers Specified in Section 09 9000 - Painting and Coating: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Other Steel Items: SSPC-SP 3, "Power Tool Cleaning."
    a. Galvanized-Steel Items: SSPC-SP 16, "Brush-off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals."

F. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

G. Field Painting: Where indicated, field paint items in accordance with Section 09 9000 - Painting and Coating.

2.11 MISCELLANEOUS MATERIALS

A. Water-Based Primer: Emulsion type, anticorrosive primer for mildly corrosive environments that is resistant to flash rusting when applied to cleaned steel, complying with MPI#107 and compatible with topcoat.

B. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

C. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

D. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

E. Separator Sheet, Self Adhered SBS Underlayment:

1. For use as follows:
    a. Where indicated on drawings.
    b. In lieu of bituminous paint, for protection between dissimilar materials, and for protection between dissimilar metals to prevent galvanic corrosive action.
2. Approved products:
    a. Mid-States “Quick-Stick” HT.
    b. W R Grace "Ice & Water Shield HT.
    c. Henry “Blueskin PE 200 HT”.
    d. Carlisle Coatings and Waterproofing, Inc., "WIP 300HT".

F. Bituminous Paint/Coating: Refer to Section 07 1115 - Protective Bituminous Paint Coating.

1. Coordinate with requirements of product/material manufacturer(s) of this Section.
2. For use as corrosion protection between dissimilar materials.

3. Apply in two coats for full coverage minimum 30 dry mil thickness, unless indicated otherwise.

2.12 FABRICATION TOLERANCES

A. Squareness: 1/16 inch (1.5 mm) maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch (1.5 mm).

C. Maximum Misalignment of Adjacent Members: 1/16 inch (1.5 mm).

D. Maximum Bow: 1/8 inch (3 mm) in 48 inches (1.2 m).

E. Maximum Deviation From Plane: 1/16 inch (1.5 mm) in 48 inches (1.2 m).

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.03 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
5. Perform field welding in accordance with AWS D1.1/D1.1M.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

F. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

G. Utilize bituminous paint to separate dissimilar metals and metals permanent contact with concrete. Install paint with minimum two coat application with installed 30 dry mil finished thickness.

H. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.04 INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

B. Anchor shelf angles securely to construction with expansion anchors and anchor bolts.

C. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.

D. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.

3.05 REPAIRS

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

3.06 FIELD FINISHING

A. Field Finishing: As indicated in this Section. Where field finishing is required, refer to Section 09 9000.

END OF SECTION

SECTION 05 5133

METAL LADDERS AND STAIRS, NON-EGRESS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Fabricated metal ladders and stairs for non-building egress applications.
   1. Roof hatch ladders.
   2. Ladder fall arrest safety system.
   3. Refer to Section 07 7200 - Roof Accessories, for roof access hatches.

1.03 REFERENCES

A. National Association of Architectural Metal Manufacturers (NAAMM). www.naamm.org

B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.

C. ASTM A139/A139M - Standard Specification for Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4 and Over).

D. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

F. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

G. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.

H. ASTM B36/B36M - Standard Specification for Brass Plate, Sheet, Strip, And Rolled Bar.

I. ASTM B135 - Standard Specification for Seamless Brass Tube.

J. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

K. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).

L. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.

2. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

B. Preinstallation Conference:

1. Preinstallation Conference: Conduct meeting minimum two weeks prior to starting work of this Section, requiring attendance of all trades affected by the Work of this Section.

2. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Metal components and fabrications of this Section.

1. Fasteners and anchors. Indicate each fastener/anchor type proposed for use at each type of project substrate. Provide evidence of suitability of each fastener for each substrate.

2. Shop primers.

3. Shrinkage-resisting grout.

4. Other fabrications required for support or installation of specified items.

C. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

1. Provide plan drawings indicating location of each item.

2. Size and location of items specified in this Section.

3. Other adjacent items including mechanical and electrical equipment, ductwork, piping, and conduit.

4. Required clearances.

D. Delegated-Design Submittal: For ladder and stair devices.

1. Provide Professional Engineer calculations and certification that the proposed devices meet or exceed all applicable code requirements including but not limited to wind,

siesmic, live load, dead load, snow load for the project location in accordance with specified criteria.

2. Detail mounting, securing, and flashing of items to structure.
3. Design calculations shall bear seal of the professional Engineer registered in the State of Louisiana.

E. Delegated-Designer Qualification Data: For professional engineer's experience with providing Delegated-Design engineering services of the kind indicated, including documentation that engineer is licensed in the State of Louisiana.

F. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

G. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

1.06 QUALITY ASSURANCE

A. Delegated-Design: Design items of this Section under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of Louisiana.

1. Items shall comply with requirements of applicable codes.
2. Include complete design of each item or assembly including materials, securement and anchorage, substrate requirements, and finishing requirements.

B. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

C. Welding Qualifications: Qualify procedures and personnel in accordance with the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification.

1. Keep items off ground and spaced by using pallets, dunnage, or other supports and spacers.
2. Protect items from corrosion and deterioration.
3. Do not store materials on structure in a manner that may cause distortion, damage, or overload to supporting structures.

B. Repair or replace damaged materials or structures as directed.

1.08 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication.

1.09 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this section.
   1. Warranty Period: One year from date of Substantial Completion.

B. Special Fabricator/Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, where items fail to perform as designed and manufactured.
   1. Warranty Period: Two years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS, GENERAL

A. General: Items shall withstand project specific conditions, including thermally induced movement, without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

B. Items shall comply with applicable code requirements and applicable OSHA requirements.

2.02 METAL JOINTING AND FINISH QUALITY LEVEL DESCRIPTIONS

A. General: All items of this Section are to be Architectural level, unless noted otherwise.

B. Architectural: All joints as inconspicuous as possible, whether welded or mechanical.
   1. Welded Joints: Continuously welded and ground smooth and flush.
   2. Mechanical Joints: Butted tight, flush, and hairline; concealed fastenings only.
   3. Exposed Edges and Corners: Eased to small uniform radius. Exposed joints tight with face surfaces aligned.
   4. Metal Surfaces to be Painted: Sanded or ground smooth, suitable for highest quality gloss finish.

2.03 MATERIALS, STEEL

A. Stainless steel:
   1. Tubing: AISI Type 302/304, meeting ASTM A789, minimum 11 ga. wall thickness.
   2. Sheet and plate: AISI Type 302/304, meeting ASTM A666, minimum 11 ga. wall thickness.

B. Steel Sections: ASTM A36/A36M.

C. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.

D. Plates: ASTM A283/A283M.

E. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.

F. Slotted Channel Framing: ASTM A653/A653M, Grade 33.

G. Slotted Channel Fittings: ASTM A1011/A1011M.

H. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.

I. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.

J. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563 (ASTM A563M); and, where indicated, flat washers.

K. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

L. Anchors, General: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing in accordance with ASTM E488/E488M, conducted by a qualified independent testing agency.

1. Cast-in-Place Anchors in Concrete: Either threaded or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F2329/F2329M.

M. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

2.04 MATERIALS, ALUMINUM

A. General: Alloy and temper recommended by item fabricator/manufacturer for type of use and finish indicated and with not less than the strength and durability properties required by Performance Requirements indicated.

B. Aluminum Plate and Sheet: ASTM B209 (ASTM B209M).

C. Aluminum Extrusions: ASTM B221 (ASTM B221M).

D. Extruded Structural Pipe and Round Tubing: ASTM B429/B429M, standard weight (Schedule 40).

E. Drawn Seamless Tubing: ASTM B210 (ASTM B210M).

2.05 FABRICATION, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Thermal Movement: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

C. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

1. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
2. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
3. Form exposed work with accurate angles and surfaces and straight edges.
4. Continuously seal joined members by continuous welds.
5. Weld corners and seams continuously to comply with the following:
    a. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
    b. Obtain fusion without undercut or overlap.
    c. Remove welding flux immediately.
    d. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
6. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
7. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
8. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
9. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
10. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2- inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.
11. Fabricate items with joints tightly fitted and secured.

D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

E. Finish and joint quality shall be as indicated for each item.

2.06 LADDER SAFETY POST

A. Description: Telescoping post permanently mounted to the top two rungs of any fixed ladder, providing a positive hand-hold and enabling the user to enter or exit an opening in an upright and balanced position.

1. Post shall be designed with a telescoping tubular section that locks automatically when fully extended. Upward and downward movement shall be controlled by a stainless steel spring balancing mechanism. Unit shall be completely assembled with fasteners for securing to the ladder rungs in accordance with the manufacturer's instructions. Provide with integral release lever.

B. Acceptable Manufacturers: Subject to compliance with requirements. Provide ladder safety post by roof hatch manufacturer.

1. Acudor Products, Inc.
2. Babcock-Davis.
3. The Bilco Co.
4. JL Industries, Inc.
5. Karp Associates.
6. Nystrom Building Products.

C. Material: Steel, hot dip galvanized.

D. Hardware: Stainless steel.

E. Finish: Manufacturer standard powder coat yellow.

2.07 LADDER FALL ARREST SAFETY SYSTEM

A. Description: Vertical cable lifeline and telescoping post permanently mounted to fixed ladder.

1. Source Limitations: Obtain items from single manufacturer.
2. For use at vertical wall mounted ladders. Provide at other locations where required by applicable codes and regulations.

B. Acceptable Manufacturers: Subject to compliance with requirements.

1. CAI Safety Systems. www.caisafety.com
2. EDGE Fall Protection. www.edgefallprotection.com
3. Safewaze, a Canopy brand. www.safewaze.com

C. Characteristics:

1. Materials: Carbon steel; ASTM A1011/A1011M, Grade 36, minimum. Manufacturer's standard hot-dipped galvanizing; comply with ASTM A153/A153M.

2. Designed to meet the requirements of ANSI Z359.16 standard, along with OSHA 1910.140, CSA Z259.2.5 and 1926.502, when used with Ladder Detachable Cable Sleeve.
3. Telescoping Single Point anchor extends 30”.
4. Ladder Detachable Cable Trolley/Sleeve.
5. 100% tie-off capability: Integrated fall arrest-rated anchor point on top bracket rated to 3,600 lbs.
6. Flexible: Mounting brackets can be used on a variety of fixed ladder styles that may consist of different rung spacing and shapes.

D. Components:
1. Vertical Cable Lifeline: Stranded galvanized steel cable to secure user to the cable system for the entire length of the ladder.
2. Telescoping Extension/Pole: Telescoping pole extends three feet above the highest ladder rung. Minimum breaking strength is 3,600 lbs (16kN). Conforms to OSHA 1926.502 and 1910.140
3. Cable Trolley: Designed to follow the user along the lifeline while ascending or descending and instantly lock in the event of a fall. Integrated with stainless steel shock-absorbing element to includes an impact indicator so that user can confirm system is safe prior to use. Use only with supplied carabiner or snaphook.
4. Self-Retracting Lifeline: 6ft. Steel Snap Hook, Single Leg. Nitrile rubber energy absorber cover. 6 ft., 3/4 Dyneema fiber and polyester web lifeline. Self-locking steel snap hook.
5. Cross-Over Style Climbing Harness, Universal Size: Full Body Harness with front universal size DRing with heavy duty webbing. Provide two. No-tangle design. Stand-up back D-ring. Front D-ring. Pass-thru buckle leg straps. Repel™ webbing. Built-in lanyard keepers. Revolver™ vertical torso adjusters. Impact Indicator. Protected labels

E. Finish: Manufacturer standard powder coat yellow.

2.08 FABRICATED STEEL LADDERS - INTERIOR WALL MOUNTED ROOF HATCH ACCESS

A. Acceptable Manufacturers: Subject to compliance with requirements.
1. Alaco Ladder Company. www.alacoladder.com
2. Cotterman, Inc.: www.cotterman.com
3. Industrial Ladder & Scaffolding, Inc.: www.anyladder.com.
4. O'Keeffe's Inc: www.okeeffes.com.

B. Prefabricated Ladder: Welded metal unit complying with ANSI A14.3; factory fabricated to greatest degree practical and in the largest components possible.

C. Components: Manufacturer's standard complying with specified requirements.
1. Steel Safety Cages: In locations required by applicable safety regulations, provide welded steel cages that are one-piece welded assemblies designed for attachment to fixed ladders up to 20 inches wide. Cage should be designed to begin approximately 7 to

8 feet from floor/ground level and extend 42 inches above the landing surface. Design with wide bottom flare for easy entry and exit.

2. Ladder Security Guard/Cover: In locations indicated on drawings, provide steel ladder security ladder guard mounted directly over ladder climbing rungs to prevent unauthorized use. Security guard shall be six feet in vertical height and with lock-open and lock-closed hasps.

D. Materials: Carbon steel; ASTM A1011/A1011M, Grade 36, minimum.

E. Size: As indicated on Drawings and in accordance with applicable codes and standards.

F. Factory Finish: Manufacturer's standard hot-dipped galvanizing; comply with ASTM A153/A153M.

G. Field Finish: Field paint factory finished surface in accordance with section 09 9000 - Painting and Coating. Color as selected by Architect.

2.09 GROUT AND ANCHORING CEMENT

A. Exterior and Wet Area Non-shrink, Nonmetallic Grout: Premixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with ASTM C1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

B. Interior Dry Area Anchoring Cement: Factory-packaged, non-shrink, non-staining, hydraulic-controlled expansion cement formulation for mixing with water at project site to create pourable anchoring, patching and grouting compound. Use for interior application only.

C. Coordinate grout and anchoring cement with project structural requirements and applicable Delegated-Design requirements. Notify project structural engineer of conflicts. Where conflict exists, the more stringent requirement shall apply.

2.10 FINISHES, STEEL

A. Galvanizing: Hot dip galvanize items as follows.

1. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft (530 g/sq m) galvanized coating.

2. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

3. For field painted ferrous steel, an alternate to galvanized steel shall be liquid applied zinc primer applied at the shop. Provide PPG Amercoat 68HS Zinc Epoxy Primer, requiring no SSPC - SP16 prep with unlimited recoatability.

B. Prime paint steel items.

1. Exceptions: Galvanize items to be embedded in concrete and items to be embedded in masonry. Coat with bituminous coating after galvanizing.

2. Exceptions: Galvanize exterior steel items prior to priming and painting.
3. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.

C. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean galvanized surfaces of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.
1. Prepare surfaces to be primed in accordance with SSPC-SP2.

D. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
1. Shop prime with primers specified in Section 09 9000 - Painting and Coating, unless zinc- rich primer is indicated.
2. Prime Painting: Two coats, minimum.

E. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:
1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Indicated to Receive Primers Specified in Section 09 9000 - Painting and Coating: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
3. Other Steel Items: SSPC-SP 3, "Power Tool Cleaning."
    a. Galvanized-Steel Items: SSPC-SP 16, "Brush-off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals."

F. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

G. Field Painting: Where indicated, field paint items in accordance with Section 09 9000 - Painting and Coating.
1. Galvanized metal: Passivator testing and removal.
    a. Step 1: Test for passivator or stabilizer using copper sulfate solution (20 grams of copper sulfate in one liter of water). If passivator or stabilizer is found to be present (i.e. no color change), remove passivator by brush blasting, sanding or chemical etching.
    b. Step 2: Using an abrasive pad, scuff a small area of the panel, then proceed to next step or use a chemical solution, Clean n Etch, on an un-scuffed part of the panel. Wait three minutes then rinse and wipe dry, then proceed to next step.
    c. Step 3: Place a drop of the copper sulfate solution on the scuffed area. The drop will turn black immediately because the copper sulfate solution reacts with the zinc forming a black precipitate, zinc sulfate. Therefore, the passivator is removed.
    d. Step 4: Clean with manufacturer approved solvent to remove grease, oil and contaminants. Wipe dry with clean cloth.

2. Galvanized metal: Prep for painting after passivator removal.
    a. Step 1: Use SSPC-SP16. Surface profile will depend on the coating and refer to manufacturers technical data page. Use standards related to SSC-SP1 Solvent Cleaning before any other prep method standard.
    b. Step 2: Clean with manufacturer approved solvent to remove grease, oil and contaminants. Wipe dry with clean cloth.

2.11 MISCELLANEOUS MATERIALS

A. Water-Based Primer: Emulsion type, anticorrosive primer for mildly corrosive environments that is resistant to flash rusting when applied to cleaned steel, complying with MPI#107 and compatible with topcoat.

B. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

C. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

D. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

E. Concrete: Comply with requirements in Section 03 3000 - Cast-in-Place Concrete, for normal-weight, air-entrained concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa).

2.12 PROTECTIVE COATING FOR DISSIMILAR MATERIAL PROTECTION AND CORROSION RESISTANCE

A. Bituminous Paint/Coating: Refer to Section 07 1115 - Protective Bituminous Paint Coating.
    1. Coordinate with requirements of material manufacturers of this Section and of adjacent materials.
    2. For use as protection between dissimilar materials in permanently concealed locations.
    3. Apply in two coats for full coverage minimum 30 dry mil thickness, unless indicated otherwise.

2.13 FABRICATION TOLERANCES

A. Squareness: 1/16 inch (1.5 mm) maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch (1.5 mm).

C. Maximum Misalignment of Adjacent Members: 1/16 inch (1.5 mm).

D. Maximum Bow: 1/8 inch (3 mm) in 48 inches (1.2 m).

E. Maximum Deviation From Plane: 1/16 inch (1.5 mm) in 48 inches (1.2 m).

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Confirm that ladder structure to which the ladder safety system is installed is capable of withstanding the loads applied by the system in the event of a fall.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

3.03 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
5. Perform field welding in accordance with AWS D1.1/D1.1M.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

F. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

G. Utilize bituminous paint to separate dissimilar metals and metals permanent contact with concrete. Install paint with minimum two coat application with installed 30 dry mil finished thickness.

H. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.04 INSTALLATION OF PREFABRICATED ITEMS

A. Comply with manufacturer or fabricator recommendations and instructions.

3.05 REPAIRS

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

3.06 FIELD FINISHING

A. Field Finishing: As indicated in this Section. Where field finishing is required, field paint factory finished surface in accordance with section 09 9000 - Painting and Coating. Color as selected by Architect.

3.07 INSTALLATION TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch (6 mm) per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch (6 mm).

C. Maximum Out-of-Position: 1/4 inch (6 mm).

END OF SECTION

SECTION 06 1053

MISCELLANEOUS ROUGH CARPENTRY

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Non-structural dimension wood materials.

B. Preservative treated wood materials.

C. Fire retardant treated wood materials.

D. Equipment mounting boards.

E. Concealed wood blocking, nailers, and supports.

F. Plywood sheathing for use at roof system base flashings.

1. Not for use in constructing roof curbs.

G. Structural dimension lumber framing and sheathing not included in this Section.

1. Refer to structural drawings and specifications.

1.03 REFERENCE DEFINITIONS

A. Boards or Strips: Lumber of less than 2 inches nominal (38 mm actual) size in least dimension.

B. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) size or greater but less than 5 inches nominal (114 mm actual) size in least dimension.

1. Blocking.

2. Nailers.

C. Exposed Framing: Framing not concealed by other construction.

D. OSB: Oriented strand board.

E. Timber: Lumber of 5 inches nominal (114 mm actual) size or greater in least dimension.

F. S4S: Surfaced four sides.

G. KDAT: Kiln Dried Wood After Treatment. Identifies preservative treated wood that is kiln dried after treatment from post-treatment moisture contents of 35 to 75 percent to a kiln dried maximum moisture content of 19 percent for lumber and 15 percent for plywood. KDAT wood provides moisture contents within acceptable ranges of many materials to be installed over treated wood substrates.

1.04 REFERENCE STANDARDS

A. ASTM D2898 - Standard Test Methods for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

C. AWPA U1 - Use Category System: User Specification for Treated Wood.

D. PS 1 - Structural Plywood.

E. PS 20 - American Softwood Lumber Standard.

F. SPIB (GR) - Grading Rules.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Provide technical data on wood preservative materials and application instructions.

1. Indicate that all submitted wood materials are fire retardant treated. Wood materials that are not fire retardant treated will not be accepted.

C. Exterior Plywood Sheathing: Where used, submit the following.

1. Product Data:

a. Indicate that all submitted wood materials are fire retardant treated. Wood materials that are not fire retardant treated will not be accepted.

b. Plywood Sheathing.

c. Securement products including fasteners and adhesives.

2. Shop Drawings:

a. Plan drawings indicating locations where sheathing to be used. Minimum drawing scale is 1/16 inch equals one foot.

b. Drawings showing sections and details of specific assembly using sheathing to be installed. Minimum drawing scale is 3/4 inch equals one foot.

c. Include complete assembly to be installed over exterior plywood sheathing. Reference the project specification section(s) containing materials and systems to be installed over sheathing.

d. Indicate coordination with requirements of other systems including written statement from other system manufacturer that proposed plywood sheathing is acceptable for use as a substrate for proposed system.

D. Manufacturer's Certificate: Certify that wood products supplied meet or exceed specified requirements.

E. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated wood.
2. Fire-retardant-treated wood.

1.06 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

B. Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

C. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Fire Retardant Project Requirement: All wood materials shall be fire retardant treated. Wood materials that are not fire retardant treated will not be accepted by Architect.

B. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.

1. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

C. Lumber fabricated from old growth timber is not permitted.

D. All wood used for interior applications, whether concealed or exposed, shall be fire retardant treated. Coordinate with fire rated assembly requirements on drawings.

E. Products shall contain no urea formaldehyde

2.02 WOOD-PRESERVATIVE-TREATED LUMBER

A. All wood materials shall be fire retardant treated. Wood materials that are not fire retardant treated will not be accepted by Architect. Preservative treated wood materials shall comply with fire retardant treated wood requirements.

B. Kiln-dry lumber after treatment (KDAT) to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Preservative Chemicals: Acceptable to code officials and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.

E. Application: Treat items indicated on Drawings, and the following:

1. Blocking, nailers, and similar members in connection with roofing, flashing, and waterproofing.
2. Wood sills, blocking, and similar concealed members in contact with masonry or concrete.
3. Plywood or other dimension lumber installed in areas subject to moisture exposure including interior areas such as kitchens, bathrooms, janitor closets, and other maintenance related areas.

2.03 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to code officials, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.

1. Treatment shall not promote corrosion of metal fasteners.
2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D2898. Use for exterior locations and where indicated.
3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201 at 92 percent relative humidity. Use where exterior type is not indicated.

C. Kiln-dry lumber after treatment (KDAT) to maximum moisture content of 19 percent. Kiln-dry plywood after treatment to maximum moisture content of 15 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

2.04 EXPOSED AND CONCEALED DIMENSION LUMBER

A. Sizes: Nominal sizes as indicated on Drawings.

B. Surfacing: S4S.

C. Moisture Content: S-dry or MC19.

2.05 EQUIPMENT MOUNTING BOARDS

A. Use PS 1 A-D plywood, 3/4 inch (19 mm) thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

2.06 ROOF BASE FLASHING SHEATHING

A. Sheathing: Plywood, PS 1, Grade C-C, Exterior Exposure 1, fire rated.

B. Comply with project structural design requirements. Coordinate with requirements of system or material to be installed over plywood sheathing.

C. Refer to project structural design requirements.

2.07 OTHER APPLICATIONS

A. General: Provide fire retardant wood materials in all locations.

B. Water Resistant Interior or Exterior Plywood:

1. Marine Grade: A-B Grade exterior structural panel, sanded on both sides.
    a. Minimum five layers/plies, knothole free, with water resistant finish.
    b. All plies shall be voidless or no void greater than 1/8 inch.
    c. Plies adhered with waterproof structural glue. A or B grade face and back veneers.
    d. Western Larch or Douglas Fir wood only.
    e. A-B Grade: 3/4 inch thickness.
    f. Paintable and stainable.
    g. Refer to Drawings for additional requirements.

C. Plywood Concealed From View But Located Within Exterior Enclosure: PS 1, C-C Plugged or better, Exterior Exposure 1 grade.

D. Plywood Exposed to View But Not Exposed to Weather: PS 1, A-D, or better.

E. Other Locations: PS 1, C-D Plugged or better.

2.08 FASTENERS AND ANCHORS

A. General: Provide nails, bolts, nuts, washers, screws, expansion bolts, clips, fasteners and accessories necessary for complete installation of rough carpentry items.

B. Metal and Finish: Comply with treated wood manufacturer recommendations for specific wood treatment utlized. Requirements indicated in this Section are minimum requirements.

1. Exterior: Stainless steel, or hot-dipped galvanized steel complying with ASTM A153/A153M.

2. Interior Dry Areas: Stainless steel, or hot-dipped galvanized steel complying with ASTM A153/A153M, or zinc plated steel complying with ASTM B633.
3. Interior Wet or High Humidity Areas: Stainless steel, or hot-dipped galvanized steel complying with ASTM A153/A153M.

C. Anchors: Expansion shield and lag bolt type for anchorage to solid masonry or concrete.

D. Nails, Brads, and Staples: ASTM F1667.

E. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to code officials, based on ICC-ES AC70.

F. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to code officials, based on ICC-ES report appropriate for substrate.

2.09 ACCESSORIES

A. Self Adhered Membrane Barrier for Dissimilar Materials:
1. For separation of treated wood products and structural steel, steel, aluminum, or other materials which cause corrosive action.
2. Self-adhesive, polyethylene film-backed barrier with release sheet.
3. Thickness: 40 mils minimum.
4. Water Vapor Permeance: 0.035 perm, maximum, when tested in accordance with ASTM E96/E96M.

B. Prefabricated supports and connectors:
1. Acceptable manufacturers:
a. Cleveland Steel Specialty Co.
b. Harlan Metal Products, Inc.
c. USP Lumber connectors.
d. Simpson Strong-Tie Co.
2. Prefabricated supports and connectors shall comply with ASTM D1761, as applicable for specific application.
3. Material: Minimum 18 gage steel.
4. Nails shall be annular ring type and of sizes recommended by prefabricated connector manufacturer’s product data.
5. Finish: Finish of supports and connectors shall be compatible with fasteners and with each other.
a. Finish for use with non-pressure treated wood products shall be G90 hot-dip galvanized.
b. Finish for use with pressure-treated wood products shall be G185 hot-dip galvanized or Type 316L stainless steel.

C. Adhesive:

1. Provide adhesive designed for adhering rough carpentry items to concrete or masonry.
2. Product shall comply with ASTM D3498 and be approved for proposed application by adhesive manufacturer.

PART 3 EXECUTION

3.01 PREPARATION

A. Coordinate installation of rough carpentry members specified in other sections.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

D. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.

E. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

G. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

H. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

I. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing membrane separator between wood and metal decking.

J. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. Applicable requirements of ICC's International Building Code (IBC).
2. ICC-ES evaluation report for fastener.

3.03 INSTALLATION OF WOOD BLOCKING AND NAILERS

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

3.04 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. Provide the non-structural framing and blocking at locations indicated on Drawings, and including but not limited to the following:

1. Cabinets.
2. Wall mounted items including wall brackets and shelving supports.
3. Handrails.
4. Grab bars.
5. Toilet accessories.
6. Wall-mounted door stops.
7. Joints of rigid wall coverings that occur between studs.

3.05 EQUIPMENT MOUNTING BOARDS

A. Provide plywood equipment mounting boards in accordance with engineering drawing and specification requirements for size, dimension, location, and finishes.

B. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.

C. Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches (610 mm) on center on all edges and into studs in field of board.

1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
3. Install adjacent boards without gaps.
4. Coordinate locations with utilities requiring backing panels.
5. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.
6. Size and Location: As indicated on drawings.

3.06 TOLERANCES

A. Framing Members: 1/8 inch from true position, maximum.

B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet (2 mm/m) maximum, and 1/4 inch in 30 feet (7 mm in 10 m) maximum.

C. Variation from Plumb: 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.07 CLEANING

A. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.

B. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 06 1600

SHEATHING

PART 1 - GENERAL

SECTION 06 11 00 – WOOD FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections (if included in project), apply to this Section.

1.2 SUMMARY

A. Section includes plywood sheathing products

1.3 REFERENCES

A. General:
   1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
   2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.

B. American Forest Products Association
   1. National Design Specification (NDS) for Wood Construction

C. American Plywood Association
   1. Plywood Design Specification (PDS)

1.4 ACTION SUBMITTALS

A. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.

B. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.

C. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.

D. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

E. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 PLYWOOD SHEATHING

A. All plywood sheathing shall comply with APA as follows and have exterior glue.
1. Floor Sheathing: APA rated 48/24, 23/32” (3/4” nominal) thick.
2. Roof Sheathing: APA rated 32/16, 19/32” (5/8” nominal) thick.
3. Wall Sheathing: APA rated 32/16, 15/32” (1/2” nominal) thick.

B. For fastening patterns to supports, see Drawings.

C. All plywood shall be treated and have exterior glue.

D. OSB will not be accepted as a substitution for plywood without approval by the Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Beginning of installation means Contractor accepts that existing conditions meet the requirements for installation.

3.2 EXECUTION

A. Comply with provisions of IBC, latest edition, including recommended fastening schedule and minimum bracing, except where exceeded by requirements of the contract documents.

B. Load-bearing wall framing is based on the final condition of the structure with the sheathing providing bracing. Contractor shall provide temporary bracing of load-bearing studs as required during construction that will reproduce the effect of sheathing. Temporary bracing is the responsibility of the Contractor and therefore at the discretion of the Contractor.

C. All plywood wall sheathing shall have solid blocking at all horizontal joints.

D. Vertical joints of plywood roof sheathing shall be staggered every four feet or less

E. Load-bearing wall framing is based on the final condition of the structure with the sheathing providing bracing. Contractor shall provide temporary bracing of load-bearing studs as required during construction that will reproduce the effect of sheathing. Temporary bracing is the responsibility of the Contractor and therefore at the discretion of the Contractor.

END OF SECTION

SECTION 06 1645

EXTERIOR GYPSUM SHEATHING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Exterior water-resistant gypsum sheathing for use at exterior wall locations.

1.03 REFERENCES

A. Reference Standards:

1. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
2. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
3. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
4. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base.
5. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
6. ASTM C1178/C1178M - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel.
7. ASTM C1278/C1278M - Standard Specification for Fiber-Reinforced Gypsum Panel.
8. ASTM C1280 - Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing.
9. ASTM C1396/C1396M - Standard Specification for Gypsum Board.
10. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
11. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
12. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
13. UL (FRD) - Fire Resistance Directory.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation to discuss conformance with project requirements, manufacturer installation requirements, affected adjacent materials and system, and site conditions.

B. Attendees shall include contractor, exterior gypsum sheathing installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Provide data on gypsum board and accessories.

C. Shop Drawings:

1. Provide gypsum board fastening pattern and anchoring data indicating compliance with applicable codes. Coordinate fastening with each cladding system assembly to be installed over gypsum board.
2. Indicate special details associated with fireproofing and acoustic seals.

D. Samples: Submit two samples of exterior gypsum board, minimum 3 by 5 inches in size.

1.06 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

1.07 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum 5 years of commercial experience.

B. Copies of Documents at Site: Maintain at the project site a copy of each referenced document that prescribes execution requirements.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original containers, dry and undamaged, with seals and labels intact.

B. Store materials in weather protected environment, clear of ground and moisture.

C. Comply with recommendations and requirements of material manufacturer.

1.09 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Gypsum board sheathing materials and installation shall comply with applicable building code requirements including exterior cladding wind resistance.

2.02 BOARD MATERIALS

A. Exterior Sheathing Board: Sizes to minimize joints in place; ends square cut.

1. Application: Exterior sheathing, unless otherwise indicated.
2. Glass Mat Faced Sheathing: Glass mat faced gypsum substrate as defined in ASTM C1177/C1177M. Provide Type X where indicated.
3. Thickness: 5/8-inch, unless indicated otherwise.
4. Size: 4 by 8 feet.
5. Surfacing: Fiberglass mat on face, back, and long edges.
6. Edges: Square.

B. Basis of Design:

1. Standard Non-Fire Rated Basis of Design: Georgia-Pacific Gypsum; DensGlass Sheathing.
2. Fire Rated Basis of Design: Georgia-Pacific Gypsum; DensGlass Fireguard Sheathing.

C. Acceptable Products: Subject to compliance with specified requirements. Provide fire rated products where indicated.

1. M-Glass Exterior Sheathing by American Gypsum Company. www.americangypsum.com
2. GlasRoc Exterior Sheathing by CertainTeed Corporation. www.certainteed.com
3. DensGlass Sheathing by Georgia-Pacific Corporation. www.buildgp.com
4. Gold Bond eXP by Gold Bond Building Products LLC, as manufactured by National Gypsum Company. www.goldbondbuilding

2.03 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. For wall sheathing, provide fasteners with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B117.

B. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.

C. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion resistant.

D. Nails, Brads, and Staples: ASTM F1667.

E. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

2.04 EXTERIOR GYPSUM WALLBOARD ACCESSORIES

A. Fluid Applied Air and Water Barrier: As specified in Section 07 2726.

B. Joint Accessories: ASTM C1047, rigid plastic, galvanized steel, or rolled zinc, unless noted otherwise.

C. Sealant for Glass-Mat Gypsum Sheathing: Elastomeric, medium-modulus, neutral-curing silicone joint sealant compatible with joint substrates formed by gypsum sheathing and other materials, recommended by sheathing manufacturer for application indicated and complying with requirements for elastomeric sealants specified in Section 07 9200 - Joint Sealants.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this Section to commence.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 INSTALLATION, GENERAL

A. Comply with manufacturer's instructions and the requirements of this Section. Where conflict exists, the more stringent requirement governs.

B. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.

C. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

D. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

E. Securely attach to substrate by fastening as indicated, complying with the following minimum requirements:

1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
2. ICC-ES evaluation report for fastener.

F. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.

G. Coordinate wall sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

H. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

I. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.03 GYPSUM SHEATHING INSTALLATION

A. Comply with GA-253 and with manufacturer's written instructions.

1. Fasten gypsum sheathing to cold-formed metal framing with screws.
2. Install panels with a 3/8-inch gap where non-load-bearing construction abuts structural elements.
3. Install panels with a 1/4-inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.

C. Vertical Installation: Install vertical edges centered over studs. Abut ends and edges with those of adjacent panels. Attach at perimeter and within field of panel to each stud.

1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of panels.

3.04 INSTALLATION OF TRIM AND ACCESSORIES

A. Expansion and Control Joints. Install control and expansion joints in accordance with board manufacturer recommendations and requirements, and in compliance with listed reference standards.

END OF SECTION

SECTION 06 2000

FINISH CARPENTRY

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Interior finish carpentry items.

1.03 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

B. Attendees shall include contractor, item installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.04 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data:

1. Provide manufacturer's product data, storage and handling instructions for factory-fabricated units.
2. Provide instructions for attachment hardware and finishes.
3. Exterior KDAT Wood: Provide evaluation reports from ICC-ES.

C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.

1. Scale of Sections: 1-1/2 inches equals 1 foot, minimum.
2. Scale of Details: 3 inches equals 1 foot, minimum.
3. Provide the information required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
4. Indicate where items cannot comply with specified quality certification standards and provide explanation.
5. Indicate locations of all finish carpentry items on project. Provide floor plans and elevations with locations. Floor plan minimum scale is 1/8 inch equals one foot. Elevations minimum scale is 1/4 inch equals one foot.

D. Certificate: Submit labels and certificates required by quality assurance and quality control programs.

E. Qualification Data: For manufacturer, fabricator and installer.

1.05 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

1.06 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

B. Fabricator Qualifications: Company specializing in fabricating the products specified in this Section with minimum five years of documented experience.

1. Company with at least one project within the past 5 years with value of woodwork within 20 percent of cost of woodwork for this project.
2. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.
3. Single Source Responsibility: Provide and install this work from single fabricator.

C. Installer Qualifications: Installer shall employ skilled workers experienced with installation of products similar to those required for this Project and whose products have a record of successful in-service performance for a minimum of five years.

D. Quality Certification:

1. Comply with one of the following:
   a. Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this Section: www.awiqcp.org.
   b. Comply with AWMAC (GIS) woodwork association quality certification service/program in accordance with requirements for work specified in this Section: www.awmac.com.
   c. Comply with WI (CCP) woodwork association quality certification service/program in accordance with requirements for work specified in this Section www.woodworkinstitute.com.
2. Provide labels or certificates indicating that the work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
3. Provide designated labels on shop drawings as required by certification program.
4. Provide designated labels on installed products as required by certification program.
5. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

E. Products shall contain no added urea-formaldehyde.

1.07 MOCKUPS

A. Mockup: Provide a mockup for evaluation of installation, finishes, and workmanship.
   1. Locate as directed by Architect.
   2. Size: As selected by Architect from one of the following based on finished carpentry item configuration.
      a. Minimum 5 lineal feet or minimum 5 square feet in configuration directed by Architect.
      b. Minimum one fabricated unit in configuration directed by Architect.

B. Do not proceed with installation beyond mockup until the mockup installation is approved by Architect. Correct deficiencies and refinish mock-up area as required to produce acceptable work.

C. Subject to compliance with requirements, approved mockups may become part of the completed Work if accepted to remain by Architect and if undisturbed at time of Substantial Completion. Remove mockup when directed by Architect.

D. Approval of mockups does not constitute approval of deviations from the Contract Documents unless Architect specifically approves such deviations in writing.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Comply with Architectural Woodwork Standards, Section 2.

B. Store finish carpentry items under cover, elevated above grade, and in a dry, well-ventilated area not exposed to heat or sunlight.

C. Protect from moisture damage.

D. Handle materials and products to prevent damage to edges, ends, or surfaces.

1.09 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation of exterior architectural woodwork only when existing and forecasted weather conditions permit work to be performed and at least one coat of specified finish to be applied without exposure to rain, snow, or dampness.

B. Field Measurements: Where finished carpentry is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings.
   1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being concealed by construction, and indicate measurements on Shop Drawings.

C. Established Dimensions: Where finished carpentry is indicated to fit to other construction, establish dimensions for areas where Work is to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.10 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.

1. Warranty Period: One year from date of Substantial Completion.

PART 2 PRODUCTS

2.01 GENERAL

A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.

B. Surface Burning Characteristics: Provide materials having fire and smoke properties as required by applicable code.

2.02 SHELVING

A. Shelving:

1. Exposed, Closet, or Utility Shelving: Made from the following materials, minimum 3/4 inch thick.

a. Plastic laminate faced plywood with factory applied-PVC front edge.

b. Shelving Wood: Baltic Birch Plywood, as specified.

2.03 INTERIOR WOOD MATERIALS, GENERAL

A. Hardwood Veneer Plywood - Birch:

1. For use as substrate for laminates.

2. Characteristics:

a. Two all Baltic Birch outer plies, comprising the front and back, showing vertical wood grain that runs lengthwise throughout the sheets.

b. All Baltic Birch Inner plies with alternating horizontal or vertical grain providing strength and resistance to warping or moisture damage.

3. Species: Baltic Birch, FSC Certified.

4. Grading: In accordance with Russian intergovernmental standard GOST 3916.1-96, most recent edition.

a. Front (Face) Grade: I, per GOST 3916.1-96.

b. Back Grade: II, per GOST 3916.1-96.

c. Sanding: S2 (factory sanded both sides)

d. Inner Plies: Minimum 1.5 mm-thick solid birch veneer, cross-banded, and laminated with exterior grade adhesive.

e. Water Resistance: FK - water resistant plywood (MR)

5. Edge: Flat, square.

6. Size: 60 by 60 inches, nominal.

7. Thickness: 0.82 inches (21 mm)/15 ply, unless noted otherwise.

2.04 FLOATING SHELF SUPPORTS

A. Floating Shelf, Support Brackets, and Hardware: As indicated on Drawings. Where not indicated, as selected by Architect.

1. Use Rating: Heavy duty.

2. Basis of Design Support Brackets: Products by Richelieu. www.richelieu.com

a. Triade XXL - Concealed Mounting Bracket for Wall Shelf.

B. Acceptable Manufacturers: Subject to compliance with requirements.

1. Federal Brace, a Short Run Pro, LLC company. www.federalbrace.com

2. Richelieu. www.richelieu.com

2.05 FASTENINGS

A. General: Provide fasteners, adhesive, wood blocking or miscellaneous fabricated metal supports needed for installation.

B. Millwork Cleat - Z-Clips: For securement of interior finish carpentry items.

1. Description: Provides straight, secure, horizontal attachments at the substrate with 3/8 inch lift off. Used to install 1/2”, 3/4” or 1” millwork panels.

a. Material: Extruded aluminum.

b. Dimensions: As indicated on drawings.

2. Basis of Design: Products by Fry Reglet Corporation: www.fryreglet.com

a. Basis of Design: MWCLEAT by Fry Reglet.

3. Acceptable Manufacturers: Subject to compliance with specified requirements.

a. Fry Reglet Corporation: www.fryreglet.com

b. Schluter Systems: www.schluter.com

c. New Age Industrial, Inc: www.newageindustrial.com

C. Metal Supports - Concealed from View: Minimum 18 ga. galvanized steel fabrications by Simpson Strong-Tie Company, Inc. www.strongtie.com

1. Provide selection as indicated on Drawings.

D. Wood Adhesive: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.

1. Comparable to “PL Premium” polyurethane construction adhesive as manufactured by Loctite.

E. Adhesive for factory-fabricated units: Manufacturer's recommended adhesive for application.

F. Fasteners for Exterior Finish Carpentry: Provide nails or screws, in sufficient length to penetrate not less than 1-1/2 inches into wood substrate.

1. Provide stainless-steel fasteners.

G. Fasteners for Interior Applications: Stainless steel; length required to penetrate wood substrate 1-1/2 inch (38 mm) minimum.

H. Concealed Joint Fasteners: Threaded steel.

I. Fasteners: Of size and type to suit application.

2.06 MISCELLANEOUS NON-WOOD FINISH CARPENTRY ITEMS

A. Coat Hooks: As indicated on Drawings.

2.07 FASTENINGS

A. General: Provide fasteners, adhesive, wood blocking or miscellaneous fabricated metal supports needed for installation.

B. Metal Clips and Metal Supports - Concealed from View: Minimum 18 ga. galvanized steel fabrications by Simpson Strong-Tie Company, Inc. www.strongtie.com

1. Provide selection as indicated on Drawings. Where not indicated, as selected by Architect.

C. Wood Adhesive: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.

1. Comparable to “PL Premium” polyurethane construction adhesive as manufactured by Loctite.

D. Adhesive for factory-fabricated units: Manufacturer's recommended adhesive for application.

E. Fasteners for Interior Applications: Stainless steel; length required to penetrate metal or wood substrate 1-1/2 inch (38 mm) minimum.

F. Concealed Joint Fasteners: Threaded steel.

G. Fasteners: Of size and type to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support blocking and framing.

B. Verify mechanical, electrical, and building items affecting work of this Section are placed and ready to receive this work.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 INSTALLATION

A. Install custom fabrications in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.

B. Install factory-fabricated units in accordance with manufacturer's printed installation instructions.

C. Set and secure materials and components in place, plumb and level.

D. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch (0.79 mm). Do not use additional overlay trim to conceal larger gaps.

3.03 FINISHING

A. Set exposed fasteners. Sand work smooth.

B. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials.

C. Provide smooth finish free from defects or irregularities. Refinish unacceptable areas.

D. For field painted items, refer to the requirements of Section 09 9000 - Painting and Coating.

3.04 TOLERANCES

A. Maximum Variation from True Position: 1/16 inch (1.6 mm).

B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch (0.79 mm).

3.05 PROTECTION AND CLEANING:

A. After completion of work, protect surfaces until date of Substantial Completion. Cover with a non-staining covering.

B. Repair and replace work damaged or stained after installation. Finished installation shall be uniform in appearance and free of squeaks, noises, vibrations and looseness.

C. Immediately prior to date of Substantial Completion, clean to new appearance.

END OF SECTION

SECTION 06 4115

ARCHITECTURAL CABINETRY

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Custom fabricated cabinet units.

B. Hardware.

1.03 REFERENCES

A. Definitions:

1. Cabinets, Casework, Cabinetry: Refers to items specified in this Section.

B. Reference Standards:

1. ANSI/AWI 0641.
2. BHMA A156.9 - American National Standard for Cabinet Hardware.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

B. Attendees shall include contractor, cabinetry installer, manufacturer technical representative, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data:

1. Provide date for prefabricated items.
2. Provide data for hardware accessories.

C. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.

1. Scale of Elevations: 3/4 inch equals 1 foot, minimum.

2. Scale of Sections: 1-1/2 inches equals 1 foot, minimum.
3. Scale of Details: 3 inches equals 1 foot, minimum.
4. Provide the information required by AWI/AWMAC/WI (AWS).
5. Include written documentation of manufacturer compliance with AWI/AWMAC/WI (AWS) certification program and product label.
6. Indicate compliance with Aesthetic and Structural grade indicated.
7. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
8. Show locations and sizes of cutouts and holes for items installed in architectural cabinets.

D. Samples for Verification:
1. Submit actual samples of architectural cabinet construction, minimum 12 inches (300 mm) square, illustrating proposed cabinet, countertop, and shelf unit substrate and finish.
2. Submit actual sample items of proposed pulls, hinges, shelf supports including standards and support pins, and locksets, demonstrating hardware design, quality, and finish.
3. Submit actual samples of laminate finishes as indicated. Minimum 3 by 5 inches in size.

E. Certificate: Submit labels and certificates required by quality assurance and quality control programs.

1.06 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements.

C. Special Manufacturer Finish Warranty: Executed warranty meeting specified requirements.

D. Maintenance Data: Provide manufacturer parts lists, operation, and maintenance instructions for the materials of this Section.

1.07 QUALITY ASSURANCE

A. Fabricator Qualifications: Company specializing in fabricating the products specified in this Section with minimum five years of documented experience.
1. Company with at least five projects in the past 5 years with value of cabinetry within 20 percent of cost of cabinetry for this Project.
2. Company with at least five projects in the past 5 years with value of cabinetry exceeding the cost of cabinetry for this Project.
3. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.

B. Quality Certification:

1. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) requirements for grade or grades specified.
2. Provide designated labels on shop drawings as required by certification program.
3. Provide designated labels on installed products as required by certification program.
4. Submit certifications upon completion of installation that verifies the work is in compliance with specified requirements.
5. Replace, repair, or rework all work for which certification is refused.

1.08 MOCKUPS

A. Mockup: Provide a mockup for evaluation of installation, finishes, and workmanship.

1. Provide mock-up of typical base cabinet, wall cabinet, and countertop, including hardware, finishes, and plumbing accessories.
2. Locate as directed by Architect.
3. Size: Minimum one fabricated unit in configuration directed by Architect.
4. Do not proceed with installation beyond mockup until the mockup installation is approved by Architect. Correct deficiencies and refinish mock-up area as required to produce acceptable work.

B. Subject to compliance with requirements, approved mockups may become part of the completed Work if accepted to remain by Architect and if undisturbed at time of Substantial Completion. Remove mockup when directed by Architect.

C. Approval of mockups does not constitute approval of deviations from the Contract Documents unless Architect specifically approves such deviations in writing.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Protect units from moisture damage.

B. Deliver materials only when the project is ready for installation and the general contractor has provided a clean storage area.

C. Maintain indoor temperature and humidity within the range recommended by the manufacturer or North American Architectural Woodwork Standards for the location of the project.

D. Store cabinets in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.10 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and

relative humidity at levels planned for building occupants during the remainder of the construction period.

B. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed/concealed by construction, and indicate measurements on Shop Drawings.

1.11 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.

1. Warranty Period: One year from date of Substantial Completion.

B. Special Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, where items fail to perform as designed and manufactured.

1. Warranty Period: Ten years from date of Substantial Completion.

C. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace cabinetry materials that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Warranty Period: Ten years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 CABINETS, CUSTOM FABRICATED UNITS

A. Final cabinetry finishes and configurations are to be determined. Additional requirements to be provided in next release.

B. Quality Standard: Complying with ANSI/AWI 0641 - Current Edition, except where noted otherwise.

1. Aesthetic - Laminate Finished: Premium Grade.

a. Structural: Performance Grade Duty Level 4.

C. Cabinet Design: As indicated on drawings.

D. Drawer Construction Technique: Dovetail joints.

E. Drawer Sliders: Ball bearing.

2.02 MATERIALS, CUSTOM FABRICATED UNITS

A. General: Performance and technical requirements shall be in accordance with basis of design product selections. Requirements of this Section establish minimum requirements.

B. Cabinetry shall be constructed with solid wood or plywood boxes, stiles, rails, doors and drawer fronts; full overlay.

C. Sustainability: Wood fabricated from old growth timber is not permitted.

D. Products shall contain no added urea-formaldehyde.

E. Hardwood Edgebanding: Where indicated, use solid hardwood edgebanding matching species, color, grain, and grade for exposed portions of cabinetry.

F. Cabinet Materials:

1. Doors and Drawer Faces - Laminate Finish: Water resistant MDF finished with thermally fused, HPL or HPDL laminate finish on all exposed surfaces.
    a. For use where indicated on Drawings.
    b. Thickness: 3/4 inch.
2. Exterior exposed wood surfaces shall match doors and drawer faces. --
3. For top, bottom, sides and drawers: Minimum 3/4 inch thick 9-ply closed grain plywood. Refer to Countertops specification sections for countertop substrates.
4. Cabinet Backs: Minimum 1/4 inch thick closed grain plywood.
5. Base Cabinets: Provide minimum 3/4 inch 9-ply closed grain plywood top. Provide pressure treated, or marine grade, water resistant tops. Comply with additional requirements indicated on Drawings; where conflict exists, the more stringent requirement shall apply.
6. Melamine Shelving: Exterior grade plywood finished with thermally fused, melamine impregnated, decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10. Melamine finish on all exposed surfaces.
    a. For use only where indicated on Drawings.
    b. Provide melamine finish on all six sides of shelving.
    c. Thickness: 3/4 inch.
    d. Color: As indicated on Drawings. Where not indicated, as selected by Architect.
7. Plastic Laminate Shelving: Provide minimum 3/4 inch 9-ply closed grain plywood.
    a. For use only where indicated on Drawings.
    b. Thickness: 3/4 inch.
    c. Provide laminate finish on all six sides of shelving.
8. MDF: Minimum ANSI A208.2, Grade 130, and as required to meet performance duty level specified.

G. Glue: All glue shall be Type-II water resistant glue.

2.03 LAMINATE MATERIALS

A. Selections: As indicated on Drawings.
   1. Drawing Designation: PL-1.
   2. Drawing Designation: PL-2.
   3. Drawing Designation: PL-3.
   4. Drawing Designation: PL-4.

B. High Pressure Laminate (HPL) or High Pressure Decorative Laminate (HPDL) Cladding for Exposed Surfaces: Coordinate with product selections.
   1. Horizontal Surfaces: NEMA LD 3, Grade HGS, 0.048 inch (1.2 mm) nominal thickness.
   2. Postformed Surfaces: NEMA LD 3, Grade HGP, 0.039 (1.0 mm) nominal thickness.
   3. Vertical Surfaces: NEMA LD 3, Grade HGS, 0.048 inch (1.2 mm) nominal thickness.

C. Melamine Laminate: Melamine impregnated, decorative paper thermally fused directly to rigid board complying with requirements of NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10. Minimum 0.020 inch (0.5 mm) nominal thickness.

D. PVC Edge Banding: Minimum 3mm thickness PVC solid, high-impact edging complying with LMA EDG-1.
   1. Edging shall be purified, color-through, acid-resistant, pre-lamination primed edging, machine-applied with waterproof hot-melt adhesives, automatically trimmed.
   2. Provide inside/outside lengths full radiused for uniform appearance.
   3. Provide colors matching laminate faces, as approved by Architect.

2.04 COUNTERTOPS

A. Countertops: Coordinate with requirements indicated on Drawings. Refer to Section 12 3600 - Countertops.

2.05 ACCESSORIES

A. Adhesive: Type recommended by fabricator to suit application.

B. Fasteners: Size and type to suit application.

C. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.

D. Grommets: Where indicated provide grommets for cut-outs.
   1. Countertop Grommet - Basis of Design: Model XG3 by Doug Mockett and Company.
      a. 3-1/2 inch diameter and designed for 3 inch cutout. Provide 7/8 inch cord slot.

b. Color: As selected by Architect from manufacturer full range.

E. Wood Blocking: Refer to the requirements of project rough carpentry specification section.

2.06 HARDWARE

A. General: Coordinate with requirements indicated on Drawings

B. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.

1. Specified products indicate minimum standards.

C. Shelf Supports: Provide type indicated on Drawings in accordance with the following. Where not indicated on Drawings, as selected by Architect from the following.

1. Adjustable Shelf Supports - Pins: Standard side-mounted system using multiple holes for pin supports and coordinated shelf rests, satin chrome finish, for nominal 1 inch (25 mm) spacing adjustments. Heavy Duty Grade. Vinyl coated..

a. Basis of Design: 348 Series by Knape and Vogt Manufacturing Co. www.knapeandvogt.com

D. Drawer and Door Pulls:

1. Selection: Mockett DP128/6.

2. Finish: As selected by Architect from manufacturer full range.

E. Cabinet Locks: Keyed cylinder, three keys per lock, master keyed, steel with satin finish. Meeting ANSI/BHMA A156.11, E07121.

1. Classrooms: Keyed cylinder locks and childproof magnetic locks.

2. All other cabinets: Keyed cylinder locks only.

F. Drawer Locks: Keyed cylinder, three keys per lock, master keyed, steel with satin finish. Meeting ANSI/BHMA A156.11, E07041.

1. Classrooms: Keyed cylinder locks and childproof magnetic locks.

2. All other cabinets: Keyed cylinder locks only.

G. Access Panel Locks: Keyed cylinder, three keys per lock, master keyed, steel with satin finish. Meeting ANSI/BHMA A156.11, E07121.

1. Classrooms: Keyed cylinder locks and childproof magnetic locks.

2. All other cabinets: Keyed cylinder locks only.

H. Door and Drawer Silencers: BHMA A156.16, L03011.

I. Catches: Push-in magnetic catches, BHMA A156.9, B03131.

J. Drawer Slides: BHMA A156.9.

1. Type: Full extension.

2. Type: Extension types as indicated.

3. Static Load Capacity: Heavy Duty grade. Minimum 75 lb capacity.

4. Mounting: Side mounted.
5. Stops: Integral type. Designed for silenced stops; in and out.
6. Features: Provide self closing/stay closed type.

K. Hinges, Non-Continuous: Heavy-duty institutional type five knuckle, hospital tip, .095 gauge, 170-degree swing. Hinge wings shall overlap interior cabinet side and back of door. Self closing, frameless concealed hinge. Shall exceed ANSI/BHMA 156.9, B01602. --
1. Full concealed installation, not visible from exterior.
2. Designed for silenced open and close.
3. Color and style selected by Architect.

L. Hinges, Continuous: Heavy-duty continuous hinge to exceed ANSI/BHMA A156.26 standard for Continuous Hinges.
1. Includes "piano" style hinges.
2. Rating: Heavy Duty.
3. Material: Stainless Steel.
4. Mounting Configuration: As indicated on Drawings.

M. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
1. As indicated on Drawings.

N. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

O. Sliding Track Assemblies: Upper and lower track of stainless steel, with matching shoe equipped with nylon rollers.

P. Cable Trays:
1. For use where indicated on Drawings.
2. Basis of Design: Quick Tray Pro by Nvent/Hoffman. www.hoffman.nvent.com
3. Configuration: Straight and curved sections.
4. Complies with the following:
   a. NFPA 70, National Electrical Code, Article 392: Cable Trays; UL Classification and labels.
   b. IEC 61537, Cable Tray Systems and Cable Ladder systems for Cable Management.
   c. NEMA VE 1, Metal Cable Tray Systems, complies with materials, sizes and configurations.
5. Accessories: Provide splice kits, washers, splice bars, washers, screws and nuts.
6. Materials: High-strength 5-mm or higher gauge steel wire with T-weld top wire.
7. Finish: Black powder coated factory finish. --

2.07 FABRICATION

A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.

B. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.

C. Provide cutouts for inserts and fixtures and fittings. Verify locations of cutouts from on-site dimensions. Seal cut edges.

2.08 FINISHES, GENERAL

A. General: Provide finishes that are 100% solids, UV cured and dried with no atmospheric emissions. Finishing products shall be extremely resistant to stains and surface damage caused by common household chemicals. Finishing products shall exceed ANSI standards for resistance to stains such as coffee, grape juice, and moisture.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

B. Verify location and sizes of utility rough-in associated with work of this Section.

C. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.

D. Field Measurements: Check actual project field dimensions before manufacturing cabinetry and coordinate with shop drawings.

E. Verify locations of necessary concealed framing and supports with respective trades.

F. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 INSTALLATION

A. Install work in accordance with AWI/AWMAC/WI (AWS) requirements for grade indicated.

B. Use fixture attachments in concealed locations for wall mounted components.

C. Use concealed joint fasteners to align and secure adjoining cabinet units.

D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch (0.79 mm). Do not use additional overlay trim for this purpose.

E. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

F. Site glaze glass materials using the Interior Dry method specified in Section 08 8000.

G. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in the shop.

H. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with cabinet surface.

1. Mechanical fasteners used at exposed and semi-exposed surfaces, excluding installation attachment screws and those securing cabinets end to end, shall be countersunk.

I. Install units level, plumb, and true in line using concealed shims.

1. Scribe and cut units to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
2. Install units without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
3. Maintain veneer sequence matching of cabinets with transparent finish.
4. Fasten wall units through back, near top and bottom, and at ends not more than 16 inches o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch penetration into wood framing, blocking, or hanging strips or No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish or toggle bolts through CMU backing walls.

3.03 ADJUSTING AND CLEANING

A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural cabinets. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean exposed and semiexposed surfaces. Touch up finishes to restore damaged or soiled areas.

D. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to the material finishes. Thoroughly rinse surfaces and dry.

E. Restore components damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by the Architect, remove damaged materials and replace with new materials.

3.04 PROTECTION

A. Protect installed materials to prevent damage by other trades. Use materials that may be easily removed without leaving residue or permanent stains.

END OF SECTION

SECTION 07 1115

PROTECTIVE BITUMINOUS PAINT-COATING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Bituminous paint coatings for corrosion protection of dissimilar materials and embedded materials in miscellaneous locations.

B. Not for use as dampproofing, waterproofing, painting, or traffic coatings. Only for use as indicated.

1.03 REFERENCES

A. ASTM D1187/D1187M - Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal.

B. ASTM D1227/D1227M - Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing

1.04 SUBMITTALS

A. Coordinate with requirements of individual specification sections.

B. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

C. Product Data: Provide manufacturer product data for bituminous paint coatings products indicating characteristics, physical properties, acceptable substrates, incompatible materials and substrates.

D. Shop Drawings: Provide plan and elevation drawings indicating all locations where product will be installed. Submit with individual sections where work occurs with protective bituminous paint coatings.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products of this Section with at least five years of documented experience.

B. Installer Qualifications: Coordinate with requirements of individual specification sections.

1.06 DELIVERY, STORAGE, AND HANDLING

A. General: Follow manufacturer instructions and recommendations.

1.07 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit installation to be performed according to manufacturers' written instructions and recommendations.

PART 2 PRODUCTS

2.01 MATERIALS, GENERAL

A. Source limitations: Obtain coating materials from single source from single manufacturer.

B. VOC content: Products shall comply with VOC content limits of authorities having jurisdiction; not more than permitted by local, State, and federal regulations.

C. Materials shall contain no asbestos.

2.02 BITUMINOUS PAINT COATINGS

A. Acceptable Products: Subject to compliance with requirements.

1. MasterSeal 610 or Masterseal 615 by Master Builders Solutions. www.master-builders-solutions.com
2. 107 Asphalt Emulsion by Henry Company. www.henry.com
3. 220AF Fibered Emulsion or 100 Non-Fibered Emulsion by Karnak Corporation. www.karnakcorp.com
4. Karnak Corp., Dampproofing.
5. Waterban 60SM or Waterban 60P by Lambert Corporation. www.lambertusa.net
6. Sealmastic Emulsion Type 1 or Type 2 by W.R. Meadows, Inc. www.wrmeadows.com

B. General: Cold-applied water-based emulsion; asphalt with mineral colloid or chemical emulsifying agent; with or without fiber reinforcement; asbestos-free; suitable for application on vertical and horizontal surfaces.

1. Application: For use only as a protective coating or "paint" intended to prevent corrosion of dissimilar or incompatible materials.
2. Meeting ASTM D1187/Type I, ASTM D1227/Type II/Class I, or ASTM D1227/Type III/Class I.
3. Brush or spray-applied.
4. Applied Thickness: Two coats minimum, 15 mils per coat wet film.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify conditions are acceptable prior to starting installation.

B. Verify substrate surfaces are durable, free of matter detrimental to adhesion or application of coating system.

C. Verify that items penetrating surfaces to receive coating are securely installed.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 SURFACE PREPARATION

A. Perform work in accordance with manufacturer's instructions.

B. Protect adjacent surfaces not designated to receive coating.

C. Do not apply coating to surfaces unacceptable to manufacturer.

D. Prior to application of materials, remove dirt, grease, mortar droppings and other foreign matter from substrate.

3.03 PROTECTIVE BITUMINOUS COATING PAINT APPLICATION

A. Perform work in accordance with manufacturer's instructions. Coordinate with the manufacturer requirements of materials that protective bituminous paint coaling is installed over.

B. Spray- or brush-apply coating in a minimum of two coats, in accord with manufacturer's product data, at a rate to achieve minimum total wet film thickness of 15 mils. Permit first coat to fully dry prior to application of second coat as required to achieve full build application of coating.

C. Pinholes in completed installation are not acceptable. Where pinholes occur, provide additional full coverage application of material.

D. Tape terminating points for clean lines. Extend coating minimum 1/16 inch and maximum 3/16 inch above finish concrete surface.

3.04 CLEAN UP

A. Perform work in accordance with manufacturer's instructions.

B. Protect adjacent finished surfaces from damage or staining from this work by masking prior to application. Repair or replace surfaces damaged or stained by coating work.

3.05 FIELD QUALITY CONTROL

A. Contractor shall perform field observation and manufacturer recommended tests to ensure installed material meets manufacturer instructions, recommendations, and requirements.

1. Where discrepancies exist, manufacturer technical representative shall provide field site visit to review conditions and provide written notice of compliance with requirements.

END OF SECTION

SECTION 07 2100

THERMAL INSULATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Exterior wall batt insulation.

B. Exterior wall board insulation.

C. Batt insulation above ceilings and soffits.

D. Insulation for filling perimeter window and door shim spaces at exterior walls.

1.03 RELATED REQUIREMENTS

A. For insulation used in conjunction with roofing and waterproofing systems, refer to applicable system specification for complete assembly.

1.04 REFERENCE STANDARDS

A. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C

B. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus

C. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.

D. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.

E. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation.

F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

G. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C.

1.05 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation to discuss conformance with project requirements, manufacturer installation requirements, affected adjacent materials and system, and site conditions.

B. Attendees shall include contractor, insulation installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.06 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

1.07 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements.

1.08 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this Section, and with minimum ten years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this Section with minimum five years documented experience.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer recommendations.

B. Store insulation indoors. Keep insulation clean and dry at all times. When transporting, cover completely with a waterproof tarpaulin as necessary.

1.10 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.

1. Warranty Period: One year from date of Substantial Completion.

B. Special Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, where items fail to perform as designed and manufactured.

1. Warranty Period: One year from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MATERIALS, GENERAL

A. For insulation integral to installed systems such as roofing and exterior insulation finish systems, refer to applicable system specification.

B. Products shall contain no added urea-formaldehyde.

2.02 BATT INSULATION MATERIALS

A. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.

1. For use within stud walls, ceilings, attics, plenums, and soffits.
2. NFPA 101, Class A Rated.
3. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
4. Smoke Developed Index: 50 or less, when tested in accordance with ASTM E84.
5. Formaldehyde Content: Zero.
6. Thermal Resistance:
    a. R-value (RSI-value) as indicated on Drawings.
7. Facing: Unfaced.
8. Width: Equal to framing spacing.
9. Acceptable Manufacturers: Subject to compliance with requirements.
    a. CertainTeed Corporation. www.certainteed.com.
    b. Johns Manville. www.jm.com.
    c. Owens Corning Corporation. www.ocbuildingspec.com.

B. Mineral Fiber Batt Insulation: Flexible or semi-rigid preformed batt or blanket, meets or exceeds the requirements of ASTM C665-Type 1 Mineral Fiber Thermal Insulation for Buildings; friction fit; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E84.

1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
2. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E84.
3. Width: Equal to framing spacing.
4. Thermal Resistance:
    a. R-value (RSI-value) as indicated on Drawings.
5. Acceptable Products and Manufacturers: Subject to compliance with requirements.
    a. Mineral Wool by by Johns Manville, a Berkshire Hathaway Company. www.jm.com.
    b. Thermafiber by Owens Corning Corporation. www.ocbuildingspec.com

c. ComfortBatt by Rockwool, a Roxul, Inc. brand. www.rockwool.com

2.03 EXTERIOR WALL POLYSTYRENE FOAM BOARD INSULATION MATERIALS

A. Extruded Polystyrene (XPS) Board Insulation: Complies with ASTM C578 with either natural skin or cut cell surfaces.

1. For use as continuous insulation at exterior walls.
2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
4. Complies with fire resistance requirements shown on the drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
5. Type and Water Absorption: Type IV, 0.3 percent by volume, maximum, by total immersion.
6. Type and Compressive Resistance: Type IV, 25 psi (173 kPa), minimum.
7. Type and R-value per Inch: Type IV, 5.0 (0.88) per 1 inch thickness at 75 degrees F mean temperature.
8. Total R-value (RSI-value) as indicated on Drawings.
9. Board Edges: Square.
10. Acceptable Products and Manufacturers: Subject to compliance with requirements.
    a. Dupont Styrofoam Cavitymate by DuPont de Nemours, Inc.
    b. Owens-Corning, Foamular 250, Square Edge.
    c. Kingspan Insulation North America, GreenGuard CM XPS Insulation Board.

2.04 MISCELLANEOUS INSULATION

A. Coordinate with assembly combustibility and fire resistance requirements.

B. Spray Polyurethane Foam Insulation: ASTM C1029, Type II, closed cell, single component, self expanding, moisture cure polyurethane, meeting the following:

1. Basis of Design: Soudafoam Fireblock by Soudal Accumetric USA. www.soudafoam.com/soudafoam-fireblock
2. Acceptable Products and Manufacturers: Subject to compliance with requirements.
    a. 3M Fire Barrier Rated Foam by 3M Industrial Adhesives and Tapes Division. www.3M.com/firestop
    b. Soudafoam Fireblock by Soudal Accumetric USA. www.soudafoam.com/soudafoam-fireblock
3. Characteristics:
    a. Designed for small space, small void, and crack and crevice installations.
    b. Mildew resistant, paintable, with minimal expansion.

c. Will not bow, or bend, window or door frames.

d. Water Absorption: Less than or equal to 1 percent.

e. R-Value: 4 per inch.

f. Meets UL 723.

g. Meets UL 1715

h. Meets NFPA 286.

i. Meets ASTM E814 (modified) ASTM E84.

C. Insulation for miscellaneous voids:

1. Glass-Fiber Insulation: ASTM C764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E84.

D. Acoustical insulation: Refer to Gypsum Board section.

E. Fire Safing insulation: Refer to Firestopping section.

2.05 ACCESSORIES

A. Tape joints of rigid insulation in accordance with roofing and insulation manufacturers' instructions.

B. Anchors/Fasteners at Exterior Continuous Insulation (Ci) Locations: Provide thermally broken cladding supports for reduction of thermal bridging in exterior walls.

1. Provide complete fastener assembly including fasteners, screws, pins, washers, and base plates.

2. Fasteners shall be appropriate type for the insulation and backup wall and capable of withstanding applied pull-out and shear-loads. Utilize anti-unwinding fasteners for metal frame construction.

3. Provide length, number, spacing and embedded depth of fasteners based on type of fastener, the applied loads, the substrate and the thickness of the insulation, strapping and any sheathing.

4. Acceptable Products: Subject to compliance with requirements.

a. Advanced Architectural Products. www.smartcisystems.com

b. Cascadia Clip by Cascadia Windows and Doors, Inc. www.cascadiawindows.com

c. Knightwall Systems. www.knightwallsystems.com

C. Adhesives: For adhering insulation to substrates. Provide adhesive provided by, or approved by, the insulation manufacturer, and air and water barrier manufacturer.

D. Nails or Staples: Steel wire; electroplated or galvanized; type and size to suit application.

E. Wire Mesh: Galvanized steel, hexagonal wire mesh.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.

B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or that interfere with insulation attachment.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop or fill entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

E. Fastener Holes and other Penetrations: Where fastener holes and other penetrations are created during installation of wall assemblies and not used (abandoned), fully seal hole with joint sealant and additional air/water barrier material in accordance with continuous air/water barrier manufacturer recommendations.

3.03 BATT INSTALLATION

A. Install insulation in accordance with manufacturer's instructions.

B. Install where indicated on Drawings within exterior wall, ceiling, soffits, and other spaces without gaps or voids with tightly butted joints. Do not compress insulation.

1. Tension wires: Friction fit unfaced insulation and secure with tension wires.
2. Stick-clip type fasteners: Install stick-clip fasteners using adhesive recommended by fastener manufacturer's product data.
3. Space clips not less than 3 inches from edges of batts and at the rate of one fastener per two square feet maximum.

C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

E. Install insulation baffles at eaves in accordance with applicable codes and as indicated on Drawings.

3.04 CONTINUOUS INSULATION INSTALLATION, GENERAL

A. Install exterior insulation in continuous, thermally uninterrupted configuration in all locations. Where discrepancies in continuity are suspected, notify Architect immediately.

3.05 BOARD INSTALLATION AT EXTERIOR WALLS, GENERAL

A. Install in accordance with manufacturer recommendations and comply with ASTM E2357. Seal joints as recommended by insulation manufacturer.

B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

C. Secure extruded polystyrene insulation to substrates using adhesive of type recommended by insulation manufacturer.

D. Secure mineral wool board insulation to substrates using adhesive or fasteners of type recommended by insulation manufacturer.

E. Seal vertical and horizontal edges using sealant or joint tape as recommended by the insulation manufacturer.

3.06 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 2119

FOAMED-IN-PLACE INSULATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Foamed-in-place insulation.

B. Protective intumescent coating.

1.03 REFERENCE STANDARDS

A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

B. ASTM D1621 - Standard Test Method for Compressive Properties Of Rigid Cellular Plastics.

C. ASTM D1622/D1622M - Standard Test Method for Apparent Density of Rigid Cellular Plastics.

D. ASTM D1623 - Standard Test Method for Tensile And Tensile Adhesion Properties of Rigid Cellular Plastics.

E. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics.

F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

G. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.

H. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

I. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials.

J. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components, Using the Intermediate-Scale, Multistory Test Apparatus.

K. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components, Using the Intermediate-Scale, Multistory Test Apparatus.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation to discuss conformance with project requirements, manufacturer installation requirements, affected adjacent materials and system, and site conditions.

B. Attendees shall include contractor, insulation installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Provide product description, insulation properties, intumescent coatings, and preparation requirements.

C. Shop Drawings: Provide drawings and details for the following;

1. Indicate locations where intumescent coating will be installed.
2. Provide manufacturer recommended details for transitions and other perimeter conditions, including penetrations. Manufacturer provided details are acceptable.

D. Certificates: Certify that products of this section meet or exceed specified requirements.

1.06 QUALITY ASSURANCE

A. General: Provide Greenguard Gold or other low-emitting certified products to comply with project LEED requirements.

B. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this Section, with not less than three years of documented experience.

C. Applicator Qualifications: Company specializing in performing work of the type specified, with minimum three years documented experience.

1.07 FIELD CONDITIONS

A. Do not apply foam when temperature is below that specified by the manufacturer for ambient air and substrate.

B. Do not apply foam when temperature is within 5 degrees F (2.78 degrees C) of dew point.

PART 2 PRODUCTS

2.01 FOAMED-IN-PLACE INSULATION - OPEN CELL

A. For use where indicated on Drawings and as selected by Architect.

B. Basis of Design: Huntsman Class Ultra Select Spray Polyurethane Foam. www.huntsmanbuildingsolutions.com

C. Acceptable Manufacturers: Subject to compliance with specified requirements.

1. BASF Corporation: www.spf.basf.com.
2. Huntsman. www.huntsmanbuildingsolutions.com
3. Johns Manville: www.jm.com.
4. Thermal Design, Inc. www.thermaldesign.com

D. Monolithic Foamed-In-Place Open Cell Insulation: Low-density, flexible, two-part, open cell 100% water-blown polyurethane foam insulation; foamed on-site using blowing agent of non-ozone-depleting gas.

1. Characteristics:
   a. Minimum R-value: As indicated on Drawings and complying with applicable project codes.
   b. Regulatory Requirements: Comply with applicable code for flame and smoke, concealment, and overcoat limitations.
   c. Air Permeance at 3 inch thickness: 0.0014 cfm/sq ft (0.007 L/second sq meter), maximum per ASTM E2178.
   d. Water Vapor Permeance at 5.5 inch Thickness: 11 perms per ASTM E96.
   e. Dimensional Stability at 28 Days: 0.0 percent at 158 degrees F and 95 percent relative humidity per ASTM D2126.
   f. Density: 0 5 pounds per cubic foot per ASTM D1622.
   g. Aged Thermal Resistance at 1 inch thickness: R 3.7 per ASTM C518.
   h. Surface Burning at 5 inch Thickness: ASTM E84 Class 1.
   i. Flame Spread Index: 20 per ASTM E84.
   j. Smoke Development: 340 per ASTM E84.
   k. Commercial Fire Resistance: Passed as part of tested assembly per NFPA 285
   l. Assembly Hourly Ratings: Tested in 1, 2, and 3 hour assembles per ASTM E119.
   m. Ceiling Commercial Fire Resistance: Pass NFPA 286 at 11.5 inch thickness.
   n. Thermal Barrier: Pass NFPA 286 at greater than 15 minutes with specified DC 315 Nor Burn Plus Thermal Barrier.

E. Intumescent Protective Paint Coating: Intumescent coating as specified in this Section. For use as required for location indicated for use. Refer to Drawings for additional requirements.

2.02 FOAMED-IN-PLACE INSULATION - CLOSED CELL

A. For use where indicated on Drawings and as selected by Architect.

B. Basis of Design: Huntsman Heatlock HFO Pro Closed Cell Spray Polyurethane Foam. www.huntsmanbuildingsolutions.com

C. Acceptable Manufacturers: Subject to compliance with specified requirements.
   1. BASF Corporation. www.spf.basf.com.
   2. Huntsman. www.huntsmanbuildingsolutions.com
   3. Johns Manville. www.jm.com.
   4. Thermal Design, Inc. www.thermaldesign.com

D. Monolithic Foamed-In-Place Insulation: Medium-density, semi-rigid, two-part, closed cell polyurethane foam; foamed on-site using blowing agent of non-ozone-depleting gas.
   1. R-value: As indicated on Drawings and complying with applicable project codes.
   2. Regulatory Requirements: Comply with applicable code for flame and smoke, concealment, and overcoat limitations.
   3. Thermal Resistance: R-value (RSI-value) of 7 minimum, per 1 inch thickness at 140 degrees F (60 degrees C) mean temperature, at 90 days, when tested in accordance with ASTM C518.
   4. Water Vapor Permeance: 0.99 perms (56.64 ng/(Pa s sq.m)), maximum, when tested at 2.4 inch (61 mm) thickness in accordance with ASTM E96/E96M.
   5. Air Permeance: 0.0014 cfm/sq ft (0.007 L/second sq meter), maximum, when tested at 1-1/4 inch (31.8 mm) thickness in accordance with ASTM E2178 or ASTM E283 at 1.57 psf (75 Pa).
   6. Closed Cell Content: Minimum 90 percent in accordance with ASTM D6226.
   7. Density: 2.0 lbs/cu ft, nominal, in accordance with ASTM D1622/D1622M.
   8. Tensile Strength: 28 psi (193 kPa), minimum, in accordance with ASTM D1623.
   9. Compressive Strength: 36 psi, minimum, in accordance with ASTM D1621.
   10. Dimensional Stability: 12% change in volume in accordance with ASTM D2126 (158°F at 97% RH).
   11. Fungus No growth in accordance with ASTM C1338.
   12. Sound Transmission Coefficient: Minimum 36 STC in accordance with ASTM E2179.
   13. Service Temperature Maximum: 180 degrees F (82 degrees C).
   14. Emissions: Passes Greenguard and Greenguard Gold.
   15. Commercial Fire Resistance; NFPA 285; Assembly Passed.
   16. TPR2 Thermal Barrier: NFPA 286; Assembly Passed.
   17. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/450, maximum, at 4 inch (102 mm) thick when tested in accordance with ASTM E84.
   18. Meeting UL Class A rating.

E. Intumescent Protective Paint Coating: Intumescent coating as specified in this Section. For use as required for location indicated for use. Refer to Drawings for additional requirements.

2.03 INTUMESCENT PROTECTIVE PAINT COATING

A. Intumescent Protective Paint Coating: Intumescent coating of type recommended by insulation manufacturer and in locations as required to comply with applicable codes.

B. Acceptable Products: Subject to compliance with requirements.

1. DC-315 by International Fireproof Technology Inc.
2. Fireshell F10E by TPR2.
3. No-Burn Plus ThB by No-Burn.

2.04 ACCESSORIES

A. Primer: As required by insulation manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify work within construction spaces or crevices is complete prior to insulation application.

B. Verify that surfaces are clean, dry, and free of matter that may inhibit insulation or overcoat adhesion.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 PREPARATION

A. Mask and protect adjacent surfaces from over spray or dusting.

B. Apply primer in accordance with manufacturer's instructions.

3.03 APPLICATION

A. Apply insulation in accordance with manufacturer's instructions.

B. Spray in lifts around penetrations and rough openings prior to spraying field area, unless recommended otherwise by insulation manufacturer.

C. Patch damaged areas.

D. Where applied to voids and gaps assure space for expansion to avoid pressure on adjacent materials that may bind operable parts.

E. Trim excess away for applied trim or remove as required for continuous sealant bead.

F. Intumescent Finish: Provide full coverage application in accordance with manufacturer recommendations. Minimum two full coverage coats; provide additional coats as required for full coverage.

G. Field Paint Finish: Provide full coverage application in accordance with manufacturer recommendations. Minimum two full coverage coats; provide additional coats as required for full coverage.

3.04 FIELD QUALITY CONTROL

A. Provide manufacturer field inspections to confirm compliance with manufacturer installation instructions and recommendations. Provide manufacturer site visit reports to Architect within three business days of site visit.

B. Inspection will include verification of insulation and overcoat thickness and density.

3.05 PROTECTION

A. Do not permit subsequent construction work to disturb applied insulation.

END OF SECTION

SECTION 07 2726

FLUID APPLIED AIR AND WATER BARRIER SYSTEM

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Vapor-permeable, fluid-applied air and water barrier system.

1.03 REFERENCES

A. ASTM International (ASTM):

1. ASTM A 240/A 240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
2. ASTM C 920 - Standard Specification for Elastomeric Joint Sealants.
3. ASTM C 1193 - Guide for Use of Joint Sealants.
4. ASTM D 412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension.
5. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
6. ASTM E 96/E 96M - Standard Test Methods for Water Vapor Transmission of Materials.
7. ASTM E 162 - Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source.
8. ASTM E 783 - Standard Test Method for Field Measurement of Air Leakage through Installed Exterior Windows and Doors.
9. ASTM E 1186 - Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems.
10. ASTM E 2178 - Standard Test Method for Air Permeance of Building Materials.
11. ASTM E 2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.

B. National Fire Protection Association (NFPA) www.nfpa.org: NFPA 285 - Standard Fire Test Method For Evaluation Of Fire Propagation Characteristics Of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.

C. U. S. Environmental Protection Agency (EPA): 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings.

1.04 DEFINITIONS

A. Air-Barrier: The collection of air-barrier materials and accessories applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

B. Water Barrier: Assembly providing a water resistive barrier at exterior wall systems not subject to hydrostatic pressure and intended to provide resistance to water penetration but no not intended for waterproofing applications.

C. Air and Water Barrier System: Assembly providing combined air barrier and water resistive barrier roles in an exterior wall assembly.

D. Weather Barrier: Refers to air and water barrier system specified in this Section.

1.05 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

B. Coordination: Coordinate installation of joint sealants with cleaning of joint sealant substrates and other operations that may impact installation or finished joint sealant work.

1. Review requirements for air and water barrier system products and installation, project and manufacturer's details, mockups, testing and inspection requirements, and coordination and sequencing of air and water barrier system work with work of other Sections.

2. Review manufacturer's instructions for air and water barrier system application meeting Project requirements for substrates specified.

C. Attendees shall include contractor, air and water barrier installer, manufacturer technical representative, and installers of adjacent materials and systems.

D. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.06 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: For each type of product.

1. Include manufacturer's written instructions for evaluating, preparing, and treating each substrate; technical data; wet and dry film thickness; and tested physical and performance properties of products.

C. Shop Drawings: For assemblies.

1. Show locations and extent of air and water barrier materials, accessories, and assemblies specific to Project conditions.

a. Indicate preparation requirements for exterior wall substrates.

2. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
3. Include details of interfaces with other materials that form part of air and water barrier system.
4. Consult air and water barrier system manufacturer for additional installation guidelines illustrations to assist with meeting shop drawing requirements.

D. Qualification Data: For Installer and manufacturer.
1. Certification of manufacturer's approval of Installer.

E. Warranty: Sample of unexecuted manufacturer and installer special warranties.

1.07 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements. Warranty shall be completed in Owner's name and registered with manufacturer.

1.08 QUALITY ASSURANCE

A. Installer Qualifications: A firm with minimum three years experience in installation of specified products in successful use on similar projects, employing workers trained by manufacturer, including a full-time on-site supervisor with a minimum of three years experience installing similar work.

B. Manufacturer Qualifications: A qualified manufacturer listed in this Section with minimum five years experience in manufacture of air and water barrier systems as one of its principal products.
1. Manufacturer's product submitted has been in satisfactory operation on five similar installations for at least five years.
2. Manufacturer is accredited by the Air Barrier Association of America.

C. Air and Water Barrier Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified air and water barrier system system, qualified to perform observation and inspection specified in Field Quality Control Article, to determine Installer’s compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Inspector shall be one of the following:
1. An authorized full-time technical employee of the manufacturer.

D. Third Party Inspector Qualifications:
1. An independent third party exterior wall and waterproofing Consultant acceptable to Architect. Inspection service shall product reports and digital photographs documenting each inspection. Reports shall be made available to the Owner, Contractor, material installer, material manufacturer, and Architect.

1.09 MOCKUPS

A. Mockup: Provide a mockup for evaluation of installation, finishes, and workmanship.
   1. Provide for each type of backup wall construction.
   2. Include examples of surface preparation, crack and joint treatment, air and water barrier system application, and flashing, transition, and termination conditions, to set quality standards for execution.
   3. Locate as directed by Architect.
   4. Size: Minimum 100 square feet in configuration directed by Architect.

B. Do not proceed with installation beyond mockup until the mockup installation is approved by Architect. Correct deficiencies and refinish mock-up area as required to produce acceptable work.

C. Subject to compliance with requirements, approved mockups may become part of the completed Work if accepted to remain by Architect and if undisturbed at time of Substantial Completion. Remove mockup when directed by Architect.

D. Approval of mockups does not constitute approval of deviations from the Contract Documents unless Architect specifically approves such deviations in writing.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Sequence deliveries to avoid delays, and to minimize on-site storage.

B. Remove and replace liquid materials that cannot be applied within their stated shelf life.

C. Deliver materials and products in labeled packages.

D. Store and handle in strict compliance with manufacturer's instructions and recommendations.

E. Protect from damage, weather, excessive temperatures, and construction operations.

F. Remove damaged material from site and dispose of in accordance with applicable regulations.

1.11 FIELD CONDITIONS

A. Environmental Limitations: Apply air and water barrier system within the range of ambient and substrate temperatures recommended in writing by air and water barrier system manufacturer.
   1. Protect substrates from environmental conditions that affect air and water barrier system performance.
   2. Do not apply air and water barrier system to a damp or wet substrate or during snow, rain, fog, or mist.

1.12 SCHEDULING

A. Coordinate installation of membrane air and water barrier system with completion of roofing and other work requiring interface with air and water barrier system.

B. Schedule work so air and water barrier system applications may be inspected prior to concealment.

C. Ensure air and water barrier system materials are cured before covering with other materials.

1.13 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.

1. Warranty Period: One year from date of Substantial Completion.

B. Special Manufacturer Warranty: Manufacturer warranty in which air and water barrier manufacturer agrees to furnish and install air and water barrier system material to repair or replace those materials installed according to manufacturer's written instructions that exhibit material defects or otherwise fail to perform as specified under normal use within warranty period specified.

1. Access for Repair: Owner shall provide unimpeded access to the Project and the air and water barrier system for purposes of testing, leak investigation, and repair, and shall reinstall removed cladding materials upon completion of repair.
2. Cost Limitation: Manufacturer's obligation for repair or replacement shall be limited to the cost of the work.
3. Warranty Period: Five years date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of air and water barrier materials from the following:

1. Movement of the structure caused by structural settlement or stresses on the air and water barrier system exceeding manufacturer's written specifications for elongation.
2. Mechanical damage caused by outside agents.

PART 2 PRODUCTS

2.01 MATERIALS

A. Source Limitations: Obtain primary fluid applied air and water barrier system materials and accessories including through wall flashings from single source from single manufacturer.

B. Compatibility: Provide membrane air and water barrier system materials that are compatible with one another and with adjacent materials under conditions of service and application required, as demonstrated by membrane air and water barrier system manufacturer based on testing and field experience.

C. Vapor Permeable Air and Water Barrier: Provide a complete vapor-permeable, fluid-applied air and water barrier system with fluid applied flashings, and through wall flashing system components. Flashing tapes are not acceptable.

2.02 MANUFACTURERS

A. Basis-of-Design Products: Provide Tremco ExoAir 230 system air and water barrier products manufactured by Tremco, Inc., www.tremcosealants.com

B. Acceptable Manufacturers and Products: Subject to compliance with requirements.

1. Carlisle Coatings and Waterproofing, Fire Resist Barritech VP. www.carlisleccw.com
2. GCP Applied Technologies, Perm-A-Barrier VPL System. www.gcpat.com
3. Henry Company, Air-Bloc 31 MR. www.henry.com
4. ProSoCo, R-Guard Cat-5 Prosoco, Inc. www.prosoco.com
5. Tremco, Inc, Tremco ExoAir 230. www.tremcosealants.com
6. W.R. Meadows, Inc., Sealtight Air-Shield LMP. www.wrmeadows.com

2.03 PERFORMANCE REQUIREMENTS

A. General: Membrane air and water barrier system shall be capable of performing as a continuous vapor-permeable air and water barrier system and as a moisture drainage plane transitioned to adjacent flashings and discharging water to the building exterior. Membrane air and water barrier systems shall accommodate substrate movement and seal expansion and control joints, construction material transitions, opening transitions, penetrations, and perimeter conditions without moisture deterioration and air leakage exceeding performance requirements.

2.04 MEMBRANE AIR AND WATER BARRIER

A. Not for use at EIFS installation areas. Refer to the requirements of Section 07 2400 - Exterior Insulation and Finish Systems.

B. Fluid-Applied, Vapor-Permeable Membrane Air and Water Barrier: Elastomeric, UV-resistant, synthetic membrane, formulated for application in an overall build (thickness) range of 48 to 70 mils (wet,) resulting in 25 to 35 mils (dry) thickness.

1. Air Permeance, ASTM E 2178: 0.004 cfm/sq. ft of surface area at 1.57-lbf/sq. ft. (0.02 L/s x sq. m of surface area at 75-Pa) pressure difference, maximum.
2. Vapor Permeance, ASTM E 96/E96M: Minimum 12 perms (690 ng/Pa x s x sq. m).
3. Elongation, Ultimate, ASTM D 412, Die C: 600 percent, minimum.
4. Combustion Characteristics: Class A, flame spread, not greater than 25; smoke developed, not greater than 450, per ASTM E 84.
5. UV Resistance, QUV-B: Over 160 cycles of UV and water spray with no observable deterioration.

6. VOC Content: Less than 50 g/L.

2.05 ACCESSORY MATERIALS

A. General: Provide primers, transition strips, termination strips, joint reinforcing fabric and strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by air and water barrier system manufacturer to produce a complete assembly and that are compatible with primary air and water barrier system material and adjacent construction to which they may seal.

B. Primer: Liquid primer meeting VOC limitations, recommended for substrate by membrane air and water barrier system manufacturer, when installing modified bituminous self-adhered membranes.

C. Rough Opening Flashing:

1. High-performance, high-movement, single-component, medium-modulus, low-VOC, UV-stable, non-sag polyurethane.
2. High Temperature Flashing Strip: Butyl, 24 mil thick self-adhering composite sheet consisting of 20 mils of butyl laminated to 4 mil polyethylene film; thermally stable under intermittent, non-continuous exposure up to 240 deg F (115 deg C).

D. Transitions:

1. Counterflashing Strip: Modified bituminous, 40 mils (1.0 mm) thick self-adhering composite sheet consisting of 32 mils (0.8 mm) of SBS rubberized asphalt laminated to an 8 mils (0.2 mm) high-density, cross-laminated polyethylene film, for counterflashing of metal flashings and for substrate transitions and for termination of air and water barrier system to bituminous roof membranes and to air and water barrier system terminations at openings.
2. High Temperature Flashing Strip and Underlayment: Butyl, 24 mil thick self-adhering composite sheet consisting of 20 mils of butyl laminated to 4 mil polyethylene film; thermally stable under intermittent, non-continuous exposure up to 240 deg F (115 deg C).
3. Flashing Strip: Butyl, 22 mil thick self-adhering composite sheet consisting of 16 mils of butyl laminated to 6 mil polypropylene film; thermally stable under intermittent, non-continuous exposure up to 240 deg F (115 deg C)
4. Opening Transition Assembly: Cured low-modulus silicone extrusion, with reinforcing ribs, sized to fit opening widths, with aluminum race for insertion into aluminum framing extrusions, with the following characteristics:
5. Preformed Silicone-Sealant Extrusion: Manufacturer's standard system consisting of cured low-modulus silicone extrusion, sized to fit opening widths, with manufacturer's recommended silicone sealant for bonding extrusions to substrates.

2.06 SELF ADHERED SBS TRANSITION MEMBRANE TO BELOW GRADE

A. Self Adhered SBS Transition Membrane to Below Grade: Provide self adhered SBS waterproofing membrane designed for below grade installation extending to bottom of foundations and footings where indicated on Drawings.

1. Provide all materials by a single source, from primary air and water barrier system manufacturer.
2. Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.
3. Provide sheet waterproofing manufactured by and compatible with wall air and water barrier system used on project. Where not manufactured by air and water barrier manufacturer, provide product accepted in writing by air and water barrier system manufacturer as compatible.
4. Minimum 60-mil nominal thickness, self-adhering sheet consisting of 56 mils of rubberized asphalt laminated on one side to a 4-mil- thick, polyethylene-film reinforcement, and with release liner on adhesive side; formulated for application with primer or surface conditioner that complies with VOC limits of authorities having jurisdiction.

B. Basis of Design: Tremco Tremprufe 560A. www.tremcosealants.com

C. Acceptable Manufacturers and Products: Subject to compliance with requirements.

1. CCW MiraDRI 860/861 by Carlisle Coatings & Waterproofing, Inc. www.carlisleccw.com
2. Bituthene 3000/4000 by GCP Applied Technologies. www.gcpat.com
3. Henry Company: Blueskin WP 200 or WP 100. www.henry.com.
4. Tremco Tremprufe 560A. www.tremcosealants.com
5. Mel-Rol by W. R. Meadows, Inc. www.wrmeadows.com

D. Reinforcing Fabric: High strength mesh fabric consisting of open-weave glass fiber saturated with synthetic resins formulated for high moisture resistance, for reinforcing of liquid applications; not less than 2.5 oz/sq. yd (85 g/sq. m).

E. Liquid Joint Sealants:

1. ASTM C 920, single-component polyurethane, approved by air and water barrier system manufacturer for adhesion and compatibility with membrane air and water barrier system and accessories.
2. ASTM C 920, single-component, neutral-curing silicone, approved by air and water barrier system manufacturer for adhesion and compatibility with membrane air and water barrier system and accessories post installation of the membrane.
3. Sprayed Polyurethane Foam Sealant: Sprayed Polyurethane Foam Sealant: Provide product approved by air and water barrier system manufacturer for adhesion and compatibility with membrane air and water barrier system and accessories.

a. Foamed-in-place, 1.5- to 2.0-lb/cu. ft. (24- to 32-kg/cu. m) density, with flame-spread index of 25 or less per ASTM E 162, for filling of gaps at openings and penetrations.

F. Through Wall Flashing Components: For through wall flashing components refer to Section 07 6200 - Sheet Metal Flashing and Trim. Includes, but is not limited to, the following:

1. Termination bars.
2. Metal through wall flashing components.
3. Flexible flashing components.

PART 3 EXECUTION

3.01 EXAMINATION

A. Surface Condition: Before applying air and water barrier system materials, examine substrate and conditions to ensure substrates are fully cured, smooth, clean, dry, and free from high spots, depressions, loose and foreign particles and other deterrents to adhesion, and conditions comply with manufacturer's written recommendations.

1. Verify concrete and masonry surfaces are visibly dry, have cured for time period recommended by membrane air and water barrier system manufacturer, and are free from release agents, curing agents, and other contaminates.
2. Test for capillary moisture by method recommended in writing by air and water barrier system manufacturer..
3. Verify masonry joints are filled with mortar and struck flush.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 INTERFACE WITH OTHER WORK

A. Commencement of Work: Commence work once air and water barrier system substrates are adequately protected from weather and will remain protected during remainder of construction.

B. Sequencing of Work: Coordinate sequencing of air and water barrier system work with work of other sections that form portions of building envelope air and water barrier system to ensure that flashings and transition materials can be properly installed and inspected. Roofing systems shall be capped and sealed, or top of walls protected, in such a way as to eliminate the ability of water to saturate the wall or interior space, both before and after, air and water barrier system system installation. Coordinate installation of system with the roofing installer to ensure compatibility and continuity with the roofing system.

C. Subsequent Work: Coordinate air and water barrier system work with work of other sections installed subsequent to air and water barrier system to ensure complete inspection of

installed air and water barrier system and sealing of air and water barrier system penetrations necessitated by subsequent work.

3.03 PREPARATION

A. Clean, prepare, and treat project substrates for air and water barrier system in accordance with manufacturer's written instructions.
   1. Mask adjacent finished surfaces.
   2. Remove contaminants and film-forming coatings from substrates.
   3. Remove projections and excess materials and fill voids with substrate patching material.

B. Prepare and treat joints and cracks in substrate per ASTM C 1193 and barrier manufacturer's written instructions.

3.04 APPLICATION OF ACCESSORY MATERIALS

A. General: Install strips, transition strips, and accessory materials according to air and water barrier system manufacturer's written instructions. Install transition materials and other accessories to form connect and seal membrane air and water barrier system material to adjacent components of building air and water barrier system system, including, but not limited to, roofing system air barrier, exterior fenestration systems, door framing, and other openings.

B. Rough Opening Flashings: Connect and seal exterior wall air and water barrier system material continuously into rough opening using specified liquid, fluid applied rough opening flashing accessory material.

C. Primer: Apply primer to substrates when recommended by air and water barrier system manufacturer at required rate for those substrates that will be receiving a modified bituminous self-adhered membrane. Reprime areas not covered within 24 hours.

D. Assembly Transitions: Connect and seal exterior wall air and water barrier system material continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
   1. Opening Transitions: Fill gaps at perimeter of openings with foam sealant and apply approved transition or accessory material
   2. Penetrations: Fill gaps at perimeter of penetrations with foam sealant and level with approved sealant. or seal transition strips around penetrating objects and terminate with approved sealant.
   3. Joints: Bridge and cover isolation joints, expansion joints, and discontinuous joints between separate assemblies utilizing approved transition or accessory materials.
   4. Changes in Plane: Apply approved sealant beads at corners and edges to form smooth transition.

5. Substrate Gaps: Cover gaps with stainless steel sheet mechanically attached to substrate and providing continuous support for air and water barrier system.

E. Flashings: Seal top of through-wall flashings to membrane air and water barrier system with a continuous bead of approved sealant recommended by air and water barrier system manufacturer.

F. Seal punctures, voids, and seams. Patch with approved transition and accessory materials following air and water barrier system manufacturer's recommendations and extend repair beyond repaired areas to maintain continuity.

3.05 FLUID AIR AND WATER BARRIER MEMBRANE INSTALLATION

A. General: Apply fluid air and water barrier system material to form a seal with transition materials and accessories to achieve a continuous air and water barrier system according to system manufacturer's written instructions. Apply fluid air and water barrier system material within manufacturer's recommended application temperature ranges.

B. Membrane Air and Water Barrier: Apply fluid air and water barrier system material in full contact with substrate to produce a continuous seal according to air and water barrier system manufacturers written instructions.

1. Vapor-Permeable Membrane Air and Water Barrier: Total dry film thickness as recommended in writing by manufacturer to meet performance requirements, in a range of 25 – 35 mils (1.0 mm) dry film thickness depending on substrate, applied in one or more equal coats, roller- or spray- applied.

C. Connect and seal exterior wall air and water barrier system membrane continuously to subsequently-installed roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, wall openings, and other construction used in exterior wall openings, using approved transitions and accessory materials.

D. Wall Openings: Apply approved sealant to adhere silicone extrusion to perimeter of windows, curtain walls, storefronts, doors, and louvers. Apply opening transition assembly and other applicable items such as preformed silicone sealant extrusions according to air and water barrier system transition manufacturer's written instructions.

E. Seal punctures, voids, and seams. Patch with approved transition and accessory materials following air and water barrier system manufacturer's recommendations and extend repair beyond repaired areas to maintain continuity.

F. Do not cover air and water barrier system until it has been tested and inspected by Owner's testing agency.

G. Correct deficiencies in or remove air and water barrier system that does not comply with requirements; repair substrates and reapply air and water barrier system components.

3.06 THROUGH WALL FLASHING INSTALLATION

A. General: Refer to the through wall flashing requirements of Section 07 6200 - Sheet Metal Flashing and Trim. Comply with air and water barrier system manufacturer's published installation guidelines and literature.

B. Flashing Joints: Splice end joints by overlapping them 6" and seal with sealant.

C. Through Wall Flashing: Where through wall flashing rests directly over steel lintels, set through wall flashing in full bed of sealant.

3.07 FIELD QUALITY CONTROL

A. Manufacturer Field Technical Representative: Contractor shall engage manufacturer's qualified field technical representative during the Work to perform tests and inspections, including documenting of materials of this Section prior to concealment.

1. Refer to Air Barrier Inspector requirements of this Section.
2. Contractor shall perform manufacturer recommended tests and inspections to air and water barrier system to ensure installed material meets manufacturer requirements. Where discrepancies exist, manufacturer technical representative shall provide field site visit to review conditions and provide written notice of compliance with requirements.

B. Testing Agency: Contractor shall engage a qualified testing agency to perform tests, inspections, and written reports in accordance with AAMA standards. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.

1. Agency to inspect substrate conditions, surface preparation, material application, protection, and components, and to furnish reports to Architect and materials manufacturer.

C. Field Testing: Inspect substrate conditions, surface preparation, material application, protection, and components, and to furnish reports to Architect and materials manufacturer.

1. Inspections and testing shall be carried out at the following rate:
    a. Up to 10,000 sq. ft. (930 sq. m): One inspection.
    b. 10,001 to 35,000 sq. ft. (931 to 3,250 sq. m): Two inspections.
    c. 35,001 to 75,000 sq. ft. (3,251 to 6,970 sq. m): Three inspections.
    d. 75,001 to 125,000 sq. ft. (6,971 to 11,610 sq. m): Four inspections.
    e. 125,001 to 200,000 sq. ft. (11,611 to 18,580 sq. m): Five inspections.
    f. Over 200,000 sq. ft. (18,580 sq. m): Six inspections.
2. Scope of Testing: Testing shall include the following:
    a. Qualitative air-leakage testing per ASTM E 1186.
    b. Quantitative air-leakage testing per ASTM E 783.
    c. Photo documentation of work to be subsequently concealed.

3. Testing Frequency: Perform tests and inspections at 10%, 50%, and 90% levels of system completion.
4. Additional testing requirements shall be as recommended by Third Party Inspector and as approved by Architect.

D. Coordination of Inspections: Cooperate with testing and inspection entities. Allow access to work areas and staging. Notify testing agency in writing of schedule for Work of this Section to allow sufficient time for testing and inspection. Do not cover Work until testing and inspection is completed and accepted.

E. Notify manufacturer, third party inspectors, Owner and Architect in advance of times when lift devices and scaffolding will be relocated. Do not relocate lift devices and scaffolding until all parties have reasonable opportunity to make observations of work areas at lift device or scaffold location.

F. Reporting: Forward written inspection reports to the Architect within 10 working days of the inspection and test being performed.

G. Correction: Correct deficient applications not passing tests and inspections, make necessary repairs, and retest as required to demonstrate compliance with requirements.

H. Defects and Repairs: Contractor shall be solely responsible for repair of defective areas.

I. Repair Verification: Number and log each patch repair. Photograph work from multiple angles to adequately demonstrate extent and final result of work. Arrange for reinspection as directed by Architect.

3.08 CLEANING AND PROTECTION

A. Protect air and water barrier system system from damage during application and remainder of construction period, according to manufacturer's written instructions.

B. Protect air and water barrier system from damage including exposure to UV light and harmful weather exposure as recommended in writing by manufacturer. If damaged or exposed to unfavorable conditions for longer than recommended, remove and replace materials or install additional, full-thickness, air and water barrier system application after repairing and preparing the damaged and/or overexposed materials according to manufacturer's written instructions.

C. Protect air and water barrier system from contact with incompatible materials and sealants not approved by system manufacturer.

D. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

E. Remove masking materials after installation.

END OF SECTION

SECTION 07 4114

STANDING SEAM METAL ROOF PANEL SYSTEM

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Standing seam metal roof panel system.

B. Flashings, underlayment and system accessories.

1.03 REFERENCES

A. Reference Standards:

1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
2. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
3. ASTM E1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.
4. ASTM E1680 - Standard Test Method for Rate of Air Leakage through Exterior Metal Roof Panel Systems.
5. FM - Tests Requirements for Class 1 Panel roofs, Factory Mutual Research Corporation.
6. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies.
7. UL 2218 - Class 4 Impact Resistance Rating.

B. SMACNA (ASMM) - Design Architectural Sheet Metal Manual; Sheet Metal and Air Conditioning Contractors National Association.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.
2. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.
3. Coordinate special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.

B. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation to discuss conformance with project requirements, manufacturer installation requirements, affected adjacent materials and system, and site conditions.

1. Attendees shall include contractor, metal panel system installer, and installers of adjacent materials and systems.
2. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

C. Shop Drawings - Contractor Prepared:

1. Provide project specific details and drawings.
2. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
3. Indicate roof insulation type, configuration, and attachment requirements needed to meet specified performance requirements.
4. Provide metal roof flashing, gutter and downspout shop drawings. Indicate gage and finish of materials. Indicate fastener type, finish and spacing. Indicate locations of field applied sealant. Indicate location size and gauge of all back up plates.
5. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches (1:10).

D. Shop Drawings - Manufacturer Prepared:

1. Provide project specific details and drawings.
2. Submit roof plan showing panel layout, gutters and downspouts as applicable.
3. Roof Insulation System: Indicate roof insulation type, configuration, and attachment requirements needed to meet specified performance requirements.
    a. Provide written statement from standing seam metal roof system manufacturer that proposed non-vented nailbase insulation is acceptable for use as a substrate for the new roof system.
4. Roof Panel Attachment:
    a. Roof plan with wind uplift pressure calculations at field, corner and perimeter areas according to version of ASCE-7 referenced by locally-adopted Building Code and the authority having jurisdiction.

b. Roof plan indicating roof clip spacing pattern at field, corner, perimeters and where panels are to be fixed from thermal movement.

c. Roof panel attachment plan must be stamped by licensed engineer in State in which project is constructed, certifying roof attachment meets local Building Code requirements for wind uplift.

5. Engineering Calculations:

a. Submit wind uplift pressure calculations according to ASCE 7 Wind Speed for project location with respect to appropriate Importance Factor, Exposure category and Safety Factor.

b. Calculations shall be sealed by a professional engineer licensed to practice structural engineering in the State of Louisiana.

6. Test Reports: Certified test results that indicate roof system meets or exceeds design and performance criteria.

7. Static Water Testing Certification:

a. The panel system shall be tested in accordance with FM4471 Appendix G, and pass with no leakage. The test specimen must successfully withstand being submerged under 6” of water for a minimum period of 7 days.

8. Air and Water Testing Certification

a. ASTM E1680 - Manufacturer’s test data for air infiltration rates up to 20 pounds per square inch differential pressure.

b. ASTM E1646 - Manufacturer’s test data for water infiltration rates up to 20 pounds per square inch differential pressure.

E. Samples for Selection: Submit manufacturer standard color charts for selection of all permanently exposed finishes.

F. Samples for Verification: When requested by Architect provide the following.

1. Roof Panels: Submit two samples, 12" long, full width panel, showing metal gage, seam and required finish.

2. Two samples each for roof panel clip, bearing plate and clip fastener.

G. Qualification Data: For Installer.

H. Field quality-control reports.

I. Sample Warranties: For special warranties.

1.06 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements. Warranty shall be completed in Owner's name and registered with manufacturer.

C. Special Manufacturer Finish Warranty: Executed warranty meeting specified requirements.

D. Maintenance Data: Provide manufacturer parts lists, operation, and maintenance instructions for the materials of this Section.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this Section, and with minimum five years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified in this Section with minimum three years of experience.

1. An entity that employs installers and supervisors who are trained and approved by manufacturer.

2. Installer must be a current National Roofing Contractors Association (NRCA) member in good standing.

C. Third Party Inspector Qualifications: An independent third party exterior roof, wall, and waterproofing Consultant acceptable to Architect. Inspection service shall product reports and digital photographs documenting each inspection. Reports shall be made available to the Owner, Contractor, waterproofing installer, waterproofing material manufacturer and Architect. Inspections should include substrate examination, beginning of installation, periodic intervals, and final inspection prior to encapsulating the work of this Section.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging with identification labels intact until ready for installation.

B. Store materials protected from exposure to harmful conditions. Store material in dry, above ground location.

C. Stack pre-finished material to prevent twisting, bending, abrasion, scratching and denting. Elevate one end of each skid to allow for moisture to run off.

D. Prevent contact with material that may cause corrosion, discoloration or staining.

E. Do not expose to direct sunlight or extreme heat trim material with factory applied strippable film.

1.09 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.10 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the Panel Applicator guaranteeing materials and workmanship for watertightness of the roofing system, flashings, penetrations, and against all leaks.
   1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Delta E units when tested according to ASTM D2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   2. Finish Warranty Period: 20 years from date of Substantial Completion.

C. Special Manufacturer Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that fail to remain weathertight, including leaks, within specified warranty period.
   1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Performance Requirements: Provide sheet metal roofing that has been manufactured, fabricated and installed to achieve the following performance without defects, damage, failure or infiltration of water.
   1. Wind Uplift: Provide tested assembly that meets or exceeds the wind load design requirements of applicable building code. Refer to cladding wind load requirements on project structural drawings.
      a. Minimum UL 90 rating over solid plywood deck in accordance with UL 580 to meet or exceed the wind load design requirements of applicable code.
   2. Static Air Infiltration: 0.06 cu ft/min/sq ft (1.1 cu m/h/sq m) at 6.24 lb/sq ft (300 Pa) air pressure differential, maximum, when tested in accordance with ASTM E283 or ASTM E1680.
   3. Water Infiltration: No evidence of water penetration at inward static air pressure differential of minimum 12.0 lb/sq ft (575 kPa), when tested in accordance with ASTM E331 or ASTM E1646.
   4. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental

effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

a. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surface temperature range.

B. Vented nailbase roof insulation shall be compatible for use as a substrate for the standing seam metal roof panel system and shall comply with roof system performance requirements as a components of the roof system assembly.

2.02 MANUFACTURERS

A. Basis of Design Manufacturer: Petersen Aluminum Corp: www.pac-clad.com.

1. Drawing Designation: MTL-4.

B. Acceptable manufacturers subject to compliance with requirements:

1. Atas International, Inc. www.atas.com
2. Englert, Inc. www.englertinc.com.
3. Fabral Metal Roof and Wall Systems. www.fabral.com
4. Imetco (Innovative Metals Company, Inc). www.imetco.com
5. McElroy Metal, Inc. www.mcelroymetal.com
6. MBCI Metal Roof and Wall Systems, Division of NCI Group, Inc. www.mbci.com
7. Petersen Aluminum Corp. www.pac-clad.com
8. The Interlock Group. www.interlockroofing.com
9. Tri County Metals Inc. www.tricountymetals.com

2.03 SHEET METAL ROOFING

A. General: Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.

B. Roof Panel - Basis of Design: Petersen Aluminum PAC-CLAD TITE LOC PLUS Panels; tension leveled flat panels with continuously interlocked standing seam; one-piece design without separate seam cover.

1. Designed for minimum minimum 1/2 inch per foot roof slope.
2. Seam Height: 2 inches minimum.
3. Material: 0.040 inch aluminum, Smooth surface coil-coated sheet, ASTM B209, 3105-H14 Alloy.
4. Panel Width: 12 or 16 inch center to center, as selected by Architect.
5. Eave Notching: Factory produced eave notching for trimmed eave panels.

C. Forming: Use continuous end rolling method. No end laps are permitted on panels without Architect approval. It is the intent of the Architect to provide factory-manufactured panel systems or systems manufactured on-site by factory personnel only for this project.

D. Profile: Vertical leg standing seam panel with male/female seams to be mechanically interlocked at jobsite with mechanical seamer specifically designed for seam profile.

E. Panel Lengths: As indicated on Drawings; panels 55 feet (16.76 m) and less fabricated in one continuous length.

F. Texture: Smooth texture, dull matte specular gloss 25 to 35 percent at 60 degrees F (15.5 degrees C).

G. Panel Fasteners: Non-penetrating type, as required to achieve wind uplift rating or otherwise as recommended by manufacturer.

H. Sealant Bead: Factory applied sealant bead.

I. Flashing and Trim: Manufacturer's standard flashing and trim profiles, factory formed; fabricated as recommended in SMACNA Design Architectural Sheet Metal Manual.

1. Material: Same as roof panels.
2. Finish: To match roof panels.
3. Color: To match roof panels.

2.04 FINISHES

A. General:

1. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
2. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
3. Finish of all permanently exposed areas of aluminum components shall be applied in accordance with the appropriate AAMA Voluntary Guide Specification indicated.

B. Pre-Finished, Factory-Painted Finish:

1. Permanently Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic, PVDF, or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).
2. Permanently Exposed Finish - PVDF (Polyvinylidene fluoride) Superior Performance Organic Multi-Coat System: Complying with AAMA 2605; and as follows:
    a. Including at least 70 percent PVDF, FSF-free resin, and having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch (0.030 mm).

b. Coats: Minimum two coat finish with primer as required by coating manufacturer to comply with specified requirements.

c. Finish Type: Arkema Group, Kynar 500, Sherwin Williams Fluropon, PPG Duranar, or Solvay Solexis, Inc., Hylar 5000 resin (Polyvinylidene fluoride, PVDF), formulated by a licensed manufacturer and applied by manufacturer's approved applicator to meet AAMA 2605.

3. Touch-Up Materials: As recommended by finish manufacturer for field application.

4. Color: As selected by Architect from manufacturer full range.

2.05 ACCESSORY MATERIALS

A. Underlayment: Self adhered SBS underlayment, designed for high temperature, standing seam metal underlayment applications. Product shall be temperature resistant up to a minimum of 250 deg F.

1. Basis of Design: Metal roof system manufacturers own underlayment.

2. Thickness: Minimum 40 mils.

3. Additional Acceptable Products: Subject to compliance with specified requirements and subject to approval by metal roof system manufacturer:

a. Grace Construction Products, Ice & Water Shield HT.

b. Henry, Blueskin PE 200 HT.

c. Mid-States, Quick-Stick HT Pro.

d. Polyglass Polystick MTS.

B. Sealant - Single Component Polyurethane: Tremco Dymonic 100, Masterseal NP-1, or Sikalastic 1A.

C. Pipe Penetrations: Provide premanufactured neoprene pipe boot as provided by, or as recommended in writing by, metal roof system manufacturer.

D. Miscellaneous Metal Flashing and Trim: Fabricate in minimum 96-inch long, but not exceeding 12-foot long, sections. Furnish with continuous cleats to support edge of external leg. Miter corners, fasten and seal watertight.

1. Coordinate with the requirements of 07 6200 - Sheet Metal Flashing and Trim.

2. Profile: As indicated on drawings.

3. Performance: Fascia/edge assemblies to meet ANSI-SPRI ES-1 wind uplift requirement.

4. Joint Style: Lapped with continuous sealant. Accommodate space required for thermal expansion and contraction.

5. Fabricate from the following materials:

a. Match specified metal roof panels.

E. Touch-Up Paint: Approved by panel manufacturer.

F. Bituminous Paint/Coating: Refer to Section 07 1115 - Protective Bituminous Paint Coating.

1. Coordinate with requirements of product/material manufacturer(s) of this Section.
2. For use as corrosion protection between dissimilar materials.
3. Apply in two coats for full coverage minimum 30 dry mil thickness, unless indicated otherwise.

2.06 FABRICATION

A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Design Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
2. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
3. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
4. Size: As recommended by SMACNA's "Design Architectural Sheet Metal Manual" or metal panel manufacturer for application, but not less than thickness of metal being secured.
5. Comply with the requirements of Section 07 6200 - Sheet Metal Flashing and Trim.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrates are acceptable for roofing installation in accordance with manufacturer's instructions.

B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.

C. Examine primary and secondary roof support substrates to verify that panel support members and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer.

D. Examine roof decking or solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal roof panel manufacturer.

E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

F. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Coordinate metal roofing with other work, including but not limited to drainage, flashing and trim, deck substrates, parapets, copings, walls, and other adjoining work.

C. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Install in accordance with manufacturer instructions and as follows.

1. Coverage: Self adhered underlayment shall be full coverage installation beneath all areas of installed metal roof system including flashings. Install in accordance with manufacturer recommendations.
2. Apply wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches (152 mm) staggered 24 inches (610 mm) between courses.
3. Overlap side edges not less than 36 inches (914.4 mm). Extend underlayment into gutter trough. Roll laps with roller.
4. Cover underlayment within 14 days or as directed by the underlayment product manufacturer.

D. Install metal roofing panels to profiles, patterns and drainage indicated, in accordance with manufacturer's instructions, and as necessary to achieve specified performance and a leak-free Installation. Allow for structural and thermal movement.

E. Separate dissimilar metals using bituminous coating to prevent galvanic action.

F. Use fasteners recommended by panel manufacturer; conceal fasteners wherever possible; cover and seal exposed fasteners.

G. Provide uniform, neat seams; provide sealant-type joint where indicated and form joints to conceal sealant.

H. Pipe Penetrations: Install as recommended in writing by pipe boot and metal roof system manufacturer.

I. Flashings: Install flashings to cover underlayment to comply with requirements specified in Section 07 6200 - Sheet Metal Flashing and Trim.

3.03 FIELD QUALITY CONTROL

A. Manufacturer Field Technical Representative: Contractor shall engage manufacturer's qualified field technical representative during the Work to perform tests and inspections, including documenting of materials of this Section prior to concealment.

B. Third Party Inspector: Contractor shall engage a qualified testing agency to inspect substrate conditions, surface preparation, material application, protection, and components, and to furnish reports to Architect and materials manufacturer.

1. Additional testing requirements shall be as recommended by Third Party Inspector and as approved by Architect.

C. Coordination of Inspections: Cooperate with testing and inspection entities. Allow access to work areas and staging. Notify testing agency in writing of schedule for Work of this Section to allow sufficient time for testing and inspection.

D. Notify manufacturer, third party inspectors, Owner, and Architect in advance of times when lift devices and scaffolding will be relocated. Do not relocate lift devices and scaffolding until all parties have reasonable opportunity to make observations of work areas at lift device or scaffold location.

E. Reporting: Forward written inspection reports to the Architect within 10 working days of the inspection and test being performed.

F. Correction: Correct deficient applications not passing tests and inspections, make necessary repairs, and retest as required to demonstrate compliance with requirements.

G. Defects and Repairs: Contractor shall be solely responsible for repair of defective areas.

H. Repair Verification: Number and log each patch repair. Photograph work from multiple angles to adequately demonstrate extent and final result of work. Arrange for reinspection as directed by Architect.

3.04 CLEANING

A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer.

B. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

C. Clean in accordance with manufacturer's instructions prior to Substantial Completion.

3.05 PROTECTION

A. Remove temporary coverings and protection of adjacent work areas. Maintain in a clean condition during construction. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 07 4215

FLUSH METAL SOFFIT PANELS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Manufactured exterior metal soffit panels, related flashings and accessory components.

1.03 REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures.

B. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum.

C. ASTM A653/A653M Standard Specification for Steel Sheets, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

D. ASTM A792/A792M Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy Coated by the Hot-Dip Process.

E. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

F. ASTM D2247 Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.

G. ASTM E1680 Standard Test Method for Determining the Rate of Air Leakage Through Exterior Metal Systems Under Specified Pressure Differences Across the Specimen.

H. ASTM E1646 Standard Test Method for Water Penetration of Metal Systems by Uniform Static Air Pressure Difference.

I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

B. Attendees shall include contractor, panel system installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Provide manufacturer product data sheets for all products of this Section.

C. Shop Drawings:

1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.

2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches (1:10).

3. Provide all manufacturer recommendations for stiffening bead locations.

4. Calculations for loadings and stresses of specially fabricated framing, signed and sealed by a professional structural engineer.

5. Delegated-Design: Provide Professional Engineer calculations and certification that the proposed design and layout meets or exceeds all applicable loads in accordance with specified Performance Requirements.

a. Indicate compliance with specified design criteria.

b. Design calculations shall bear seal of the professional Engineer registered in the State of Louisiana.

D. Samples: Submit two samples of each wall panel, 12 inch by 12 inch (305 mm by 305 mm) in size illustrating finish color, sheen, and texture.

E. Designer's Qualification Statement: Written statement of designer qualifications.

F. Manufacturer's Qualification Statement.

G. Installer's Qualification Statement.

1.06 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements.

C. Special Manufacturer Finish Warranty: Executed warranty meeting specified requirements.

D. Maintenance Data: Provide manufacturer maintenance instructions for the materials of this Section.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum ten years of documented experience.

B. Installer Qualifications: Company specializing in installing products of the type specified in this Section with minimum ten years of documented experience and approved by manufacturer.

C. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.

1.08 MOCKUPS

A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Comply with the requirements of Section 01 4339 - Mockups.
2. Locate as directed by Architect.
3. Build mockup of typical metal panel assembly minimum 8 by ten feet including corner, adjacent construction, supports, attachments, and accessories.
4. Water-Spray Test: Conduct water-spray test of metal panel assembly mockup, testing for water penetration according to AAMA 501.2. Provide results to Architect and indicate pass/fail status including locations and causes of failure, if any.

B. Subject to compliance with requirements, approved mockups may become part of the completed Work if accepted to remain by Architect and if undisturbed at time of Substantial Completion.

C. Approval of mockups does not constitute approval of deviations from the Contract Documents unless Architect specifically approves such deviations in writing.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.

B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Retain strippable protective covering on metal panels during installation.

1.10 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.11 COORDINATION

A. Coordinate metal panel installation with rain drainage work, flashing, trim, adjacent construction, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.12 WARRANTY

A. Special Manufacturer Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including rupturing, cracking, or puncturing.
      b. Deterioration of metals and other materials beyond normal weathering.
   2. Warranty Period: Ten years from Date of Substantial Completion.

B. Special Manufacturer Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Delta E units when tested according to ASTM D2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   2. Finish Warranty Period: 20 years from Date of Substantial Completion.

C. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.
   1. Warranty Period: Two years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS, EXTERIOR LOCATIONS

A. Delegated-Design: Engage a qualified professional engineer, licensed in the State of Louisiana to design metal panel system to meet the project requirements.

B. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E1592:
   1. Wind Loads: As indicated on Drawings and as required by applicable codes.
   2. Other Design Loads: As indicated on Drawings and as required by applicable codes.
   3. Deflection Limits: For wind loads, no greater than 1/180 of the span.

C. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) when tested according to ASTM E283 at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).
2. <0.01 cfm/ft2 at 20 psf for vertical or horizontal installation.

D. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E331 at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).
2. No uncontrolled leakage when tested to a static pressure of 20 psf for vertical or horizontal installation.

E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient and 180 deg F (100 deg C), material surfaces.

F. Surface Burning Ratings: Comply with ASTM E84; testing by a qualified testing agency.

1. Flame Spread less than 25, smoke developed less than 450 per ASTM E84.

2.02 CONCEALED-FASTENER, LAP-SEAM METAL SOFFIT PANELS

A. General: Provide factory-formed metal panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation.

B. Basis of Design: Pac-Clad Flush Panels by Petersen, a Carlisle Company. www.pac-clad.com

1. Drawing Designation: MTL-1.
2. Panel Profile: Flush seam with no reveal.
3. Width: 7 inch.
4. Panel Thickness (depth): 1 inch.
5. Material: Minimum 0.040 inch thick aluminum.
6. Joints: Integral interlocking legs with panel manufacturer provided clips.
7. Panel Face Texture: Smooth.

2.03 MISCELLANEOUS MATERIALS

A. Underlayment: Self adhered SBS underlayment, designed for high temperature, metal panel underlayment applications.

1. Basis of Design: Metal panel system manufacturers own underlayment.
2. Additional acceptable products subject to approval by metal roof system manufacturer:

a. Mid-States, Quick-Stick HT.

b. W R Grace, Ice & Water Shield HT.

c. Henry, Blueskin PE 200 HT.

B. Miscellaneous Metal Subframing and Furring: ASTM C645, cold-formed, metallic-coated steel sheet, ASTM A653/A653M, G90 (Z275 hot-dip galvanized) coating designation or ASTM A792/A792M, Class AZ50 (Class AZM150) aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.

C. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.

1. Corners: Provide factory fabricated, seamless, 90-degree mitered corners.
2. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal panels.
3. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
4. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

D. Metal Support Components at Exterior Continuous Insulation Locations: Provide thermally broken cladding supports for reduction of thermal bridging in exterior walls.

1. Basis of Design: Knightwall CI by Knightwall Systems. www.knightwallsystems.com
2. Acceptable Products: Subject to compliance with requirements.
   a. Advanced Architectural Products. www.smartcisystems.com
   b. Cascadia Clip by Cascadia Windows and Doors, Inc. www.cascadiawindows.com
   c. Knightwall Systems. www.knightwallsystems.com
   d. Wall cladding system manufacturer’s own thermally broken components.

E. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers; as applicable. Finish flashing and trim with same finish system as adjacent metal panels.

1. For miscellaneous sheet metal items not provided by specified primary product manufacturer, refer to the requirements of Section 07 6200.
2. Profile: As indicated on drawings.
3. Performance: Fascia/edge/coping assemblies to meet ANSI-SPRI ES-1 wind resistance requirement.

4. Joint Style: Lapped with continuous sealant. Accommodate space required for thermal expansion and contraction.
5. Fabricate from the following materials:
    a. Match specified metal roof panels.

F. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

G. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
1. Coordinate with the requirements of 07 9200 - Joint Sealants.
2. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
3. Joint Sealant: ASTM C920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
4. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

H. Touch-Up Paint: Approved by panel manufacturer.

I. Bituminous Paint/Coating: Refer to Section 07 1115 - Protective Bituminous Paint Coating.
1. Coordinate with requirements of product/material manufacturer(s) of this Section.
2. For use as corrosion protection between dissimilar materials.
3. Apply in two coats for full coverage minimum 30 dry mil thickness, unless indicated otherwise.

2.04 FABRICATION

A. Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.

C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

D. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.

E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
4. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
7. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal panel manufacturer for application but not less than thickness of metal being secured.

2.05 FINISHES

A. General:

1. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
2. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
3. Finish of all permanently exposed areas of aluminum components shall be applied in accordance with the appropriate AAMA Voluntary Guide Specification indicated.

B. Pre-Finished, Factory-Painted Finish:

1. Permanently Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic, PVDF, or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).
2. Permanently Exposed Finish - PVDF (Polyvinylidene fluoride) Superior Performance Organic Multi-Coat System: Complying with AAMA 2605; and as follows:

a. Including at least 70 percent PVDF, FSF-free resin, and having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch (0.030 mm).

b. Coats: Minimum two coat finish with primer as required by coating manufacturer to comply with specified requirements.

c. Finish Type: Arkema Group, Kynar 500, Sherwin Williams Fluropon, PPG Duranar, or Solvay Solexis, Inc., Hylar 5000 resin (Polyvinylidene fluoride, PVDF), formulated by a licensed manufacturer and applied by manufacturer's approved applicator to meet AAMA 2605.

3. Touch-Up Materials: As recommended by finish manufacturer for field application.

4. Color: As selected by Architect from manufacturer full range.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.

1. Examine support framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.

2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.

3. Verify that air and water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 PREPARATION

A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C754 and metal panel manufacturer's written recommendations.

3.03 INSTALLATION, GENERAL

A. Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Shim or otherwise plumb substrates receiving metal panels.
2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
3. Install screw fasteners in predrilled holes.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Install flashing and trim as metal panel work proceeds.
6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

B. Fasteners:

1. Aluminum Panels: Use aluminum or stainless steel fasteners for surfaces exposed to the exterior; use aluminum or galvanized-steel fasteners for surfaces exposed to the interior.

C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

D. Fastener Holes and other Penetrations: Where fastener holes and other penetrations are created during installation of wall assemblies and not used (abandoned), fully seal hole with joint sealant and additional air/water barrier material in accordance with continuous air/water barrier manufacturer recommendations.

3.04 ACCESSORIES, FLASHING, TRIM INSTALLATION

A. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal panel manufacturer; or, if not indicated, provide types recommended by metal panel manufacturer.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.

1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof performance.

2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (610 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

3.05 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect completed metal panel installation, including accessories. Confirm compliance with manufacturer installation procedures and delegated-design requirements.

B. Remove and replace metal panels where tests and inspections indicate that they do not comply with specified requirements.

C. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.

D. Prepare test and inspection reports and provide to Architect.

3.06 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

B. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 4215

FORMED METAL WALL PANELS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Manufactured exterior metal wall panels, related flashings and accessory components.

1.03 REFERENCE STANDARDS

A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures.

B. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum.

C. ASTM A653/A653M Standard Specification for Steel Sheets, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

D. ASTM A792/A792M Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy Coated by the Hot-Dip Process.

E. ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

F. ASTM D2247 Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.

G. ASTM E1680 Standard Test Method for Determining the Rate of Air Leakage Through Exterior Metal Systems Under Specified Pressure Differences Across the Specimen.

H. ASTM E1646 Standard Test Method for Water Penetration of Metal Systems by Uniform Static Air Pressure Difference.

I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

B. Attendees shall include contractor, panel system installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Provide manufacturer product data sheets for all products of this Section.

C. Shop Drawings:

1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.

2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches (1:10).

3. Provide all manufacturer recommendations for stiffening bead locations.

4. Calculations for loadings and stresses of specially fabricated framing, signed and sealed by a professional structural engineer.

5. Delegated-Design: Provide Professional Engineer calculations and certification that the proposed design and layout meets or exceeds all applicable loads in accordance with specified Performance Requirements.

a. Indicate compliance with specified design criteria.

b. Design calculations shall bear seal of the professional Engineer registered in the State of Louisiana.

D. Samples: Submit two samples of each wall panel, 12 inch by 12 inch (305 mm by 305 mm) in size illustrating finish color, sheen, and texture.

E. Designer's Qualification Statement: Written statement of designer qualifications.

F. Manufacturer's Qualification Statement.

G. Installer's Qualification Statement.

1.06 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements.

C. Special Manufacturer Finish Warranty: Executed warranty meeting specified requirements.

D. Maintenance Data: Provide manufacturer maintenance instructions for the materials of this Section.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum ten years of documented experience.

B. Installer Qualifications: Company specializing in installing products of the type specified in this Section with minimum ten years of documented experience and approved by manufacturer.

C. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.

1.08 MOCKUPS

A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Locate as directed by Architect.
2. Build mockup of typical metal panel assembly minimum 8 by ten feet including corner, adjacent construction, supports, attachments, and accessories.
3. Water-Spray Test: Conduct water-spray test of metal panel assembly mockup, testing for water penetration according to AAMA 501.2. Provide results to Architect and indicate pass/fail status including locations and causes of failure, if any.

B. Subject to compliance with requirements, approved mockups may become part of the completed Work if accepted to remain by Architect and if undisturbed at time of Substantial Completion.

C. Approval of mockups does not constitute approval of deviations from the Contract Documents unless Architect specifically approves such deviations in writing.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.

B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Retain strippable protective covering on metal panels during installation.

1.10 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.11 COORDINATION

A. Coordinate metal panel installation with rain drainage work, flashing, trim, adjacent construction, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.12 WARRANTY

A. Special Manufacturer Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including rupturing, cracking, or puncturing.
      b. Deterioration of metals and other materials beyond normal weathering.
   2. Warranty Period: Ten years from Date of Substantial Completion.

B. Special Manufacturer Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Delta E units when tested according to ASTM D2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   2. Finish Warranty Period: 20 years from Date of Substantial Completion.

C. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.
   1. Warranty Period: Two years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS, EXTERIOR LOCATIONS

A. Delegated-Design: Engage a qualified professional engineer, licensed in the State of Louisiana to design metal panel system to meet the project requirements.

B. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E1592:
   1. Wind Loads: As indicated on Drawings and as required by applicable codes.
   2. Other Design Loads: As indicated on Drawings and as required by applicable codes.
   3. Deflection Limits: For wind loads, no greater than 1/180 of the span.

C. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) when tested according to ASTM E283 at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).
2. <0.01 cfm/ft2 at 20 psf for vertical or horizontal installation.

D. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E331 at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).
2. No uncontrolled leakage when tested to a static pressure of 20 psf for vertical or horizontal installation.

E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient and 180 deg F (100 deg C), material surfaces.

F. Surface Burning Ratings: Comply with ASTM E84; testing by a qualified testing agency.

1. Flame Spread less than 25, smoke developed less than 450 per ASTM E84.

2.02 WALL PANEL - CONCEALED FASTENER METAL PANELS

A. Basis of Design: Precision HWP Metal Panel by Petersen Aluminum Corp. www.pac-clad.com

1. Drawing Designation: MTL-2.

B. Characteristics: Corrugated profile, symmetrical rib panel designed for clip fastened wall installation and no exposed fasteners.

1. Material: 0.040 inch aluminum, ASTM B 209 3105-H14 alloy.
2. Panel Width: 12 inches.
3. Panel Profile - Continuous Rib Spacing: 2.667-inches on center.
4. Rib Height/Depth: 7/8-inch.

C. Panel Surface: Smooth.

D. Finishes: Pre-finished/factory-painted exposed surface finish, as specified.

2.03 MISCELLANEOUS MATERIALS

A. Underlayment: Self adhered SBS underlayment, designed for high temperature, metal panel underlayment applications.

1. Basis of Design: Metal panel system manufacturers own underlayment.
2. Additional acceptable products subject to approval by metal roof system manufacturer:
   a. Mid-States, Quick-Stick HT.

b. W R Grace, Ice & Water Shield HT.

c. Henry, Blueskin PE 200 HT.

B. Miscellaneous Metal Subframing and Furring: ASTM C645, cold-formed, metallic-coated steel sheet, ASTM A653/A653M, G90 (Z275 hot-dip galvanized) coating designation or ASTM A792/A792M, Class AZ50 (Class AZM150) aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.

C. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.

1. Corners: Provide factory fabricated, seamless, 90-degree mitered corners.
2. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal panels.
3. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
4. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

D. Metal Support Components at Exterior Continuous Insulation Locations: Provide thermally broken cladding supports for reduction of thermal bridging in exterior walls.

1. Basis of Design: Knightwall CI by Knightwall Systems. www.knightwallsystems.com
2. Acceptable Products: Subject to compliance with requirements.
    a. Advanced Architectural Products. www.smartcisystems.com
    b. Cascadia Clip by Cascadia Windows and Doors, Inc. www.cascadiawindows.com
    c. Knightwall Systems. www.knightwallsystems.com
    d. Wall cladding system manufacturer’s own thermally broken components.

E. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers; as applicable. Finish flashing and trim with same finish system as adjacent metal panels.

1. For miscellaneous sheet metal items not provided by specified primary product manufacturer, refer to the requirements of Section 07 6200.
2. Profile: As indicated on drawings.
3. Performance: Fascia/edge/coping assemblies to meet ANSI-SPRI ES-1 wind resistance requirement.
4. Joint Style: Lapped with continuous sealant. Accommodate space required for thermal expansion and contraction.

5. Fabricate from the following materials:
    a. Match specified metal roof panels.

F. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

G. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
1. Coordinate with the requirements of 07 9200 - Joint Sealants.
2. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
3. Joint Sealant: ASTM C920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
4. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

H. Touch-Up Paint: Approved by panel manufacturer.

I. Bituminous Paint/Coating: Refer to Section 07 1115 - Protective Bituminous Paint Coating.
1. Coordinate with requirements of product/material manufacturer(s) of this Section.
2. For use as corrosion protection between dissimilar materials.
3. Apply in two coats for full coverage minimum 30 dry mil thickness, unless indicated otherwise.

2.04 FABRICATION

A. Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.

C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

D. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.

E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
4. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
7. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal panel manufacturer for application but not less than thickness of metal being secured.

2.05 FINISHES

A. General:

1. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
2. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
3. Finish of all permanently exposed areas of aluminum components shall be applied in accordance with the appropriate AAMA Voluntary Guide Specification indicated.

B. Pre-Finished, Factory-Painted Finish:

1. Permanently Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic, PVDF, or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).
2. Permanently Exposed Finish - PVDF (Polyvinylidene fluoride) Superior Performance Organic Multi-Coat System: Complying with AAMA 2605; and as follows:
    a. Including at least 70 percent PVDF, FSF-free resin, and having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch (0.030 mm).

b. Coats: Minimum two coat finish with primer as required by coating manufacturer to comply with specified requirements.

c. Finish Type: Arkema Group, Kynar 500, Sherwin Williams Fluropon, PPG Duranar, or Solvay Solexis, Inc., Hylar 5000 resin (Polyvinylidene fluoride, PVDF), formulated by a licensed manufacturer and applied by manufacturer's approved applicator to meet AAMA 2605.

3. Touch-Up Materials: As recommended by finish manufacturer for field application.

4. Color: As selected by Architect from manufacturer full range.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.

1. Examine support framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.

2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.

3. Verify that air and water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 PREPARATION

A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C754 and metal panel manufacturer's written recommendations.

3.03 INSTALLATION, GENERAL

A. Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Shim or otherwise plumb substrates receiving metal panels.

2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
3. Install screw fasteners in predrilled holes.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Install flashing and trim as metal panel work proceeds.
6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

B. Fasteners:

1. Aluminum Panels: Use aluminum or stainless steel fasteners for surfaces exposed to the exterior; use aluminum or galvanized-steel fasteners for surfaces exposed to the interior.

C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

D. Fastener Holes and other Penetrations: Where fastener holes and other penetrations are created during installation of wall assemblies and not used (abandoned), fully seal hole with joint sealant and additional air/water barrier material in accordance with continuous air/water barrier manufacturer recommendations.

3.04 ACCESSORIES, FLASHING, TRIM INSTALLATION

A. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal panel manufacturer; or, if not indicated, provide types recommended by metal panel manufacturer.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.

1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof performance.

2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (610 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

3.05 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect completed metal panel installation, including accessories. Confirm compliance with manufacturer installation procedures and delegated-design requirements.

B. Remove and replace metal panels where tests and inspections indicate that they do not comply with specified requirements.

C. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.

D. Prepare test and inspection reports and provide to Architect.

3.06 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

B. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 5423

TPO THERMOPLASTIC ROOFING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Fully adhered thermoplastic polyolefin (TPO) roofing system.

B. Miscellaneous system accessories and components.

1.03 REFERENCES

A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

B. ASTM D8231, Standard Practice for the Use of a Low Voltage Electronic Scanning System for Detecting and Locating Breaches in Roofing and Waterproofing Membranes.

C. ASTM E1980 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.

D. FM (AG): FM Approval Guide; current edition.

E. ITS (DIR): Directory of Listed Products; current edition.

F. UL (DIR): Online Certifications Directory; current edition.

G. UL (FRD): Fire Resistance Directory; current edition.

H. ASCE-7: American Society of Civil Engineers (ASCE) Minimum Design Loads and Associated Criteria for Buildings and Other Structures; current edition in accordance with applicable codes.

I. ANSI/SPRI ES-1: Wind Design Standard for Edge Systems Used with Low-Slope Roofing Systems.

J. SMACNA Architectural Sheet Metal Manual, current edition.

K. NRCA Roofing and Waterproofing Manual, current edition.

L. ICC including applicable companion ICC codes.

1.04 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

B. Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," before multiplication by a safety factor.

C. Factored Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," after multiplication by a safety factor.

1.05 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

1. Review roofing requirements, including surface preparation, substrate condition and pretreatment, substrate curing requirements, forecasted weather conditions, special details, flashings, installation procedures, testing and inspection procedures, and protection and repairs.

2. Review transitions from continuous exterior air and water barrier system to roof membrane system. Maintain continuity of exterior air and water barrier system at all transitions. Transition details shall be submitted to Architect and approved prior to start of installation.

B. Attendees shall including contractor, roof system installer, roof deck installer(s), roof system manufacturer technical representative, air and water barrier system installer, exterior joint sealant system installer, and installers of adjacent materials and systems including but not limited to mechanical, electrical and plumbing system installers.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.06 PERFORMANCE REQUIREMENTS

A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.

C. Roofing System Assembly: Provide a roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE 7 with applicable safety factor.

D. Wind, Fire and Hail Resistance - Roof Membrane System:

1. Provide products and system complying with specified requirements as minimum design standard; regardless of testing agency relationship to Owner or participation in project.
2. Wind Resistance: Provide roof system assembly identical to system currently tested to meet FM 1-90 performance level specified.
    a. Provide products and system complying with specified FMG requirements as minimum design standard; regardless of FMG participation in project.
    b. Fire/Windstorm Classification: Meeting the requirements of roof system cladding design wind uplift resistance requirements listed on Project structural drawings. Minimum FM 1A-90.
3. Fire-Test-Response Characteristics: Provide roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, and/or FMG. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.
    a. Exterior Fire-Test Exposure: Class A; ASTM E108 (UL 790) for application and roof slopes indicated.
    b. Fire-Resistance Ratings: ASTM E119, for fire-resistance-rated roof assemblies of which roofing system is a part.

E. Agency Approvals:

1. All products used shall bear Factory Mutual Global (FMG) and Underwriters Laboratories (UL) approval.
2. Designated seal of approval shall be clearly visible on all product packing.
3. System and components shall comply with applicable state International Building Code (IBC) requirements including ANSI-SPRI/ES-1.

1.07 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Manufacturer Product Data: Provide for all products.

1. Where UL or FM requirements are specified, provide documentation that shows that the roofing system to be installed is UL-Classified or FM-approved, as applicable; include data itemizing the components of the classified or approved system.

C. Shop Drawings:

1. Provide project specific details customized for this project for all relevant conditions, including temporary terminations (end of workday, etc), flashings, base tie-ins, roof edges, terminations, expansion joints, penetrations, and drains. Manufacturer standard details are not acceptable.
2. For tapered insulation, provide project-specific layout and dimensions for each board.

D. Specimen Warranty: Submit sample warranty meeting the requirements of this Section. Submit prior to starting work.

E. Installer Qualifications: Letter from manufacturer attesting that the roofing installer meets the specified qualifications listed in the Quality Assurance article of this Section.

F. Manufacturer Qualifications: Letter from manufacturer attesting that the primary roof membrane manufacturer meets the specified qualifications listed in the Quality Assurance article of this Section.

G. Manufacturer Project Acknowledgement: Letter from manufacturer attesting that; the manufacturer has reviewed the project and is familiar with the requirements of the roof system installation.

1. Indicate that proposed roof system meets specified performance requirements.
2. Indicate that proposed roof system meets specified warranty requirements.
3. Indicate that manufacturer will provide manufacturer direct field technical support for the installer as needed for a successful installation
4. Indicate that manufacturer will provide required roof system field inspections needed for the proposed roof system warranty.
5. Indicate that upon successful completion of installation of proposed roof system by installer, the manufacturer will provide the specified warranty.

1.08 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements. Warranty shall be completed in Owner's name and registered with manufacturer.

C. Maintenance Data: Provide manufacturer maintenance instructions for the materials of this Section.

1.09 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that has been a manufacturer approved applicator in good standing for the past five (5) consecutive years prior to project bid date. Installer must have been in business under the same name for at least five (5) consecutive years. Contractor shall be approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's twenty (20) year warranty.

1. Installer's Field Supervision: Installer is required to maintain a full-time supervisor / foreman, with supervision-only responsibilities, on job site during times that membrane roofing work is in progress. The individual shall be experienced in installation of roofing systems similar to type and scope required for this Project.

B. Manufacturer Qualifications: A qualified manufacturer that has UL listing and FMG approval for membrane roofing system identical to that used for this Project. Manufacturer shall have a minimum ten (10) years of successful manufacture of membrane using the same membrane formulation.

1. Obtain components for roofing system from or approved by roofing system manufacturer Provide primary products, including each type of roofing sheet, composition flashings, and vapor barrier (where used), produced by a single manufacturer. Provide secondary products only as recommended and approved by the manufacturer of primary products for use with roofing system specified.
2. Manufacturer’s Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design and extent to those specified for this Project. Manufacturer’s Sales Representative will not be accepted as a Technical Representative.

C. Source Limitations: Obtain components for roofing system from or approved by roofing system manufacturer. Provide primary products, including each type of roofing sheet, adhesives, primers, fasteners, accessories, flashings, and vapor barrier (if any), produced by a single manufacturer. Provide secondary products only as recommended by the manufacturer of primary products for use with roofing system specified.

D. Third Party Inspector Qualifications: An independent third party exterior roof, wall, and waterproofing Consultant acceptable to Architect. Inspection service shall product reports and digital photographs documenting each inspection. Reports shall be made available to the Owner, Contractor, roofing/waterproofing installer, roofing/waterproofing material manufacturer and Architect. Inspections should include substrate examination, beginning of installation, periodic intervals, and final inspection prior to encapsulating the work of this Section.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storage.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturers written instructions for handling, storing, and protecting during installation.

D. Store and handle roofing roll goods and rigid insulation boards in a manner, which will ensure that there is no possibility of significant moisture pick-up.

E. All material must be protected from the weather by protective tarps. Manufacturer's plastic covers are not acceptable means of protection.

F. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.11 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

B. At the end of each days work temporary cut-offs and tie-ins shall be made weathertight, no exceptions.

C. At the end of the days work all materials stored materials are to be recovered, tied and weighted down.

1.12 ROOF SYSTEM WARRANTY

A. The Contractor is to provide both a Manufacturer's Roof System Warranty, and Contractor Roof Warranty.

1. Warranties which contain language regarding the governing of the warranty by any state other than the State of Louisiana, must be amended to exclude such language, and substituting the requirement that the laws of the the State of Louisiana shall govern all such warranties.

B. Special Manufacturer Warranty: Manufacturer's TOTAL SYSTEM WARRANTY, "No Dollar Limit" (NDL) "Without Monetary Limitations", in which manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.

1. Special warranty includes the following new items; roofing and flashing membrane, base flashings, roofing membrane accessories, roof insulation, cover board, adhesives, fasteners, cold fluid applied flashings, and roof system edge metal including gravel stops, copings, and fascia.
2. Wind Speed Warranty: Roof system warranty shall include failures for damage resulting from up to 3 second, 90 mph wind gusts, minimum.
3. Warranty must be a single source warranty; a joint manufacturer warranty is not acceptable. Warranty shall not include option for manufacturer to buy out warranty in lieu of repair or replacement.
4. Warranty shall contain no exclusions for roof top temperature. Warranty shall not exclude typical rooftop operating temperatures.
5. Warranty Period: Thirty (30) years from date of Acceptance. Non-prorated.

C. Special Installer Warranty: Contractor roof warranty covering Work of this Project.
   1. Warranty Period: Two (2) years from date of Substantial Completion to run simultaneously with manufacturer warranty.
   2. Coverage: Same as roof system manufacturers warranty and as follows;
      a. All labor, materials, and workmanship provided by installer, including roof sheet metal items other than gravel stops, copings, and fascia.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with specified roof system requirements, provide products by the following:
   1. Acceptable Manufacturers: Subject to compliance with requirements.
      a. Carlisle-Syntec, Inc. www.carlislesyntec.com
      b. Johns Manville, Inc. www.jm.com/en/commercial-roofing/
      c. Siplast, Inc. www.siplast.com

B. Source Limitations: Obtain components for roofing system from roof membrane system manufacturer.

2.02 TPO ROOF MEMBRANE

A. Internal Fabric-Reinforced TPO Sheet: ASTM D6878 internally fabric or scrim reinforced, uniform, flexible TPO sheet.
   1. Thickness: 80 mils, nominal.
   2. Exposed Face Color: Manufacturer standard white. Product shall comply with current applicable project building codes including reflectivity and SRI ratings.

2.03 FLUID APPLIED (LIQUID APPLIED) FLASHING MEMBRANE

A. Provide fully reinforced cold fluid (liquid) applied roof membrane system to be included in the specified warranty for the TPO roof membrane system. Color to match specified TPO roof membrane exposed face color.
   1. For use at roof penetrations and at low base flashings less than 8 inches above finished roof surface.
   2. For use at other locations indicated on Drawings.
   3. Basis of Design: Product provided by, or accepted in writing by, the TPO roof membrane system manufacturer.
      a. Carlisle LiquiSeal system.
      b. Johns Manville SP Liquid Flashing Resin system.
      c. Kemper System 1k-PUR.

B. Acceptable products subject to compliance with requirements:

1. Membrane system manufactured by specified TPO roof membrane manufacturer.
2. Membrane system approved for use and warrantable by TPO roof membrane manufacturer.

2.04 ADHESIVES AND CLEANERS

A. General: All products shall be provided by the roof membrane manufacturer for use in the specified roof system.

B. TPO Bonding Adhesive: A high-strength, adhesive designed for bonding specified membrane to various substrates included in this project. The adhesive is applied to both the membrane and the substrate at a coverage rate of approximately 45-50 square feet per gallon per finished surface (includes coverage on both surfaces).

C. TPO Cut-Edge Sealant: A clear-colored sealant used to seal cut edges of reinforced membrane. A coverage rate of approximately 225-275 linear feet per squeeze bottle can be achieved when a 1/8" diameter bead is applied.

D. Water Cut-Off Mastic: Used as mastic to prevent moisture migration at drains, compression terminations and beneath conventional metal edging at a consistent width and thickness application coverage rate of approximately 10 feet per tube or 100 feet per gallon.

E. Universal Single-Ply Sealant: A 100% solids, solvent free, one-part, polyether sealant that provides a weather tight seal to a variety of building substrates. Can be used as a termination bar sealant or for use in counterflashing, coping/parapet, and scupper details.

F. TPO One-Part Pourable Sealer: A one-part, moisture curing, elastomeric polyether sealant used to fill Molded Sealant Pockets. Packaged in four 1/2 gallon pouches per plastic bucket. One pouch will fill one Molded Sealant Pocket.

G. Foil Grip Aluminum Tape: A general-purpose pressure-sensitive sealant used as a bond break at joints in TPO Coated Metal. Packaged in rolls 2 inches wide by 100 feet long.

H. TPO Membrane Cleaner: Used to prepare membrane that has been exposed to the elements for approximately 7 days prior to heat welding or to remove general construction dirt at an approximate coverage rate of 400 square feet per gallon (one surface).

2.05 AUXILIARY MATERIALS AND ACCESSORIES

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing system. Items used from the section must be acceptable to the system manufacturer for use in conjunction with their roof system, and not effect specified warranty coverage.

B. Fastener Requirements: Factory-coated steel fasteners and metal plates, batten bars and termination bars meeting corrosion-resistance provisions in FMG 4470, designed for fastening roofing system components to substrate, tested by manufacturer for required pullout

strength, and acceptable to roofing system manufacturer. Tested to meet or exceed specified wind uplift requirements.

1. Fasteners subject to compliance with specified roof system performance requirements.
2. Steel Deck Insulation Fasteners and Plates: Provide fastener recommended or required by roof membrane system manufacturer for assembly to comply with specified requirements.
    a. Basis of Design: Extra Heavy Duty #15 by SFS, OMG, TRUFAST or fasteners provided by roof system manufacturer.
    b. Provide 3-inch diameter, galvanized steel plates approved by the fastener for specified wind uplift requirements.
3. Wood Substrate Insulation Fasteners and Plates: Provide fastener recommended or required by roof membrane system manufacturer for assembly to comply with specified requirements.
    a. Basis of Design: Extra Heavy Duty #15 by SFS, OMG, TRUFAST or fasteners provided by roof system manufacturer.
    b. Provide 3-inch diameter, galvanized steel plates approved by the fastener for specified wind uplift requirements.

C. Nailers and Blocking: Refer to structural specifications on Drawings for structural sheathing and refer to Section 06 1053 - Miscellaneous Rough Carpentry for non-structural sheathing.

D. Termination Bar: Prefabricated 1 inch wide and .098 inch thick extruded aluminum bar pre-punched 6” on center; incorporates a sealant ledge to support lap sealant and provide increased stability for membrane terminations.

E. Term Bar Nail-Ins: Minimum 1-1/4 inch long expansion anchor with a zinc plated steel drive pin used for fastening the Termination Bar or Seam Fastening Plates to concrete or masonry walls.

F. Universal Adhesive: Used to adhere lightning protection air terminals and pipe supports to protection membrane. Not for use as membrane, cover board, or insulation adhesive.
1. Basis of Design: Chem Link M-1.
2. Characteristics: Moisture cure, multi-purpose structural adhesive designed for bonding and sealing a wide range of construction materials. Capable of adhering to specified protection membrane and acceptable to roof membrane system manufacturer.

G. Condensation Drain Line Supports: Provide drain line support at HVAC equipment condensation drain lines, spaced as required for stability and as recommended by support manufacturer.
1. Manufacturers: Erico Inc, Miro Industries, or as provided by roof membrane system manufacturer
2. Configuration:
    a. Supports shall be designed and installed to resist code required wind uplift. Refer to project wind uplift design requirements on Drawings.

b. Supports shall be roller equipped.

c. Equip with pipe straps.

H. Penetration Flashing: Flash penetrations with specified fluid applied flashing membrane.

1. Prefabricated Boots: Not permitted. Flash penetrations with specified fluid applied flashing membrane.

2. Penetration Pitch Pockets: Not permitted. Flash penetrations with specified fluid applied flashing membrane.

I. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer such as pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

J. Filter Fabric: Provide filter fabric by membrane manufacturer for use in specified assembly. Minimum 1/4 inch thick and black color.

2.06 ROOF SYSTEM SHEET METAL COMPONENTS

A. Metal Counterflashings and Trim:

1. Refer to Section 07 6200 - Sheet Metal Flashing And Trim.

B. Metal Copings:

1. Refer to Section 07 7112 - Manufactured Copings.

C. Metal Fascia including Gravel Stops:

1. Refer to Section 07 7119 - Manufactured Gravel Stops and Fascia.

2.07 POLYISOCYANURATE RIGID INSULATION

A. For use in locations indicated on Drawings and for roof system drainage at tapered cricket assemblies.

B. Provide insulation system composed of combination flat and tapered insulation to provide positive slope to roof system drainage points.

1. Minimum Slope: One-quarter inch per foot or more. Refer to drawings.

2. Minimum Insulation Board Thickness: 1.5". Overall system thickness shall be as required to provide minimum indicated total system R-Value.

3. Minimum Total Insulation System R-Value: R25, unless indicated otherwise, for all layers combined, in all locations.

4. Minimum Layers: Two layers, staggered minimum 6 inches in each direction.

5. Provide flat and tapered insulation as required for roof drainage tapered crickets.

C. Flat Polyisocyanurate Roof Insulation Board: thickness as indicated meeting ASTM C 1289, Type II, Class 1, Grade 2 (20 psi), felt or glass-fiber mat facer on both major surfaces.

1. Thickness: 1.5" minimum, field shaved edges at max 1:2 slope as needed for transitions.

2. Facings to be type recommended for fully adhered, mechanically fastened, or bead applied adhesive installations, where applicable.
3. Maximum Board size: 48 by 48 inches, or 48 by 96 inches, as recommended by roof system manufacturer for project specific installation.

D. Tapered Polyisocyanurate roof insulation board crickets: thickness as indicated meeting ASTM C 1289, Type II, Class 1, Grade 2 (20 psi), felt or glass-fiber mat facer on both major surfaces.
1. Thickness: Varies
2. Facings to be type recommended for fully adhered or bead applied adhesive installations, where applicable.
3. Slope of tapered insulation at crickets to be double the slope of adjacent roof area.
4. Maximum board size: 48 by 48 inches.

2.08 ROOF COVER BOARD

A. For use beneath all new roof membrane field (horizontal) installation areas.

B. General: Choose one of the following in accordance with roof membrane manufacturer requirements for roof system performance and warranty requirements.
1. High density polyisocyanurate rigid cover board as provided by the roof membrane manufacturer. 1/2" minimum thickness.
2. Gypsum Board, ASTM C 1177, glass-mat, water and fire-resistant gypsum board designed for roofing applications.
a. Thickness: 1/4-inch thick minimum. Provide 5/8-inch thick board where indicated in roof assemblies on Drawings.
b. Product: Subject to compliance with requirements, provide "DensDeck Prime" by Georgia-Pacific Corporation or as provided by roof membrane system manufacturer.
3. Gypsum-Fiber Roof Board: ASTM C 1278, fiber reinforced gypsum panel, water and fire-resistant gypsum board designed for roofing applications.
a. Thickness: 1/4-inch thick minimum.
b. Product: Subject to compliance with requirements, provide "Securock" by US Gypsum (USG) Corporation or as provided by roof membrane system manufacturer.

2.09 MISCELLANEOUS USE ROOF INSULATION

A. Mineral Fiber Batt Insulation: Flexible or semi-rigid preformed batt complying with ASTM C665; friction fit; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E84.
1. For use in miscellaneous voids and spaces indicated on Drawings. Not for use beneath roof membrane as primary roof system insulation.
2. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.

3. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E84.
4. Thermal Resistance: As indicated on Drawings. Minimum total R25.
5. Thickness: As indicated on Drawings.
6. Manufacturers:
   a. Knauf Insulation; EcoBatt Insulation: www.knaufinsulation.com
   b. ROCKWOOL (ROXUL, Inc); COMFORTBATT: www.rockwool.com

B. Spray Polyurethane Foam Insulation: ASTM C1029, Type II, closed cell, single component, self expanding, moisture cure polyurethane, meeting the following:
1. For use at small space, small void, and crack and crevice installations where mineral fiber batt insulation cannot not fit, and in locations where indicated on Drawings. Not for use beneath roof membrane as primary roof system insulation.
2. Mildew resistant, paintable, with minimal expansion.
3. Water Absorption: Less than or equal to 1%.
4. Thermal Resistance: As indicated on Drawings. Minimum total R25.
5. R-Value: 4 per inch.
6. Meets UL 723.
7. Meets UL 1715
8. Meets NFPA 286.
9. Meets ASTM E814 (modified) ASTM E84.
10. Basis of Design: Soudafoam Fireblock by Soudal Accumetric USA. www.soudafoam.com/soudafoam-fireblock

2.10 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with roofing.

B. Insulation Adhesive: Roof insulation and cover board adhesive provided by primary roof membrane manufacturer.
1. At non-structural concrete decks, only for use as attachment method for tapered crickets, subject to the specified wind uplift resistance requirements.
2. Low rise urethane foam adhesive for full or partial coverage application as required to meet project wind uplift and warranty requirements.

2.11 PROTECTION MEMBRANE MATERIALS AT WALKWAYS (WALKPAD)

A. Flexible Walkways: Factory-formed TPO, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads, approximately 80 mils thick (170 mils overall) by 34” wide and acceptable to roofing system manufacturer.
1. Designed for heat welded or membrane adhesive application.

2. As provided by primary roof membrane system manufacturer.
3. Surface color to contrast with roof membrane surface: Provide white, gray or tan as selected by Architect.

B. For use as a walkway protection membrane. Provide as indicated on Drawings and at the following minimum locations.
1. Rooftop mechanical units; surrounding the unit minimum 36 inches on all sides and minimum 72 inches at service side(s).
2. Roof access hatches; surrounding the front and sides of hatch minimum 72 inches.

2.12 PROTECTION MEMBRANE MATERIALS AT NON-WALKWAY AREAS

A. Factory-formed, fully internally reinforced TPO membrane, .080 inches (80 mils) thick and acceptable to roof membrane system manufacturer.
1. Smooth surfaced with no raised tactile walking protrusions.
2. Designed for heat welded or membrane adhesive application.
3. As provided by primary roof membrane system manufacturer for use as a protective membrane. Typical internally reinforced, non-fleeceback, 80 mil thick TPO roof membrane is acceptable for use.
4. Surface color to match roof membrane surface color.

B. For use as an additional layer of protection membrane, over completed roof system where indicated on Drawings and at the following minimum locations:
1. Beneath supports that sit directly on finished roof system surface including but not limited to lightning protection system air terminals, splash blocks, pipe supports, and condensation line supports.
2. Beneath locations where downspout empties to lower roof surface. Provide minimum 2 by 2 foot size, in two layers, centered on downspout.
a. Extend upper layer minimum 2-inches up vertical face of adjacent base flashing to form cove/cant for drainage.
b. Fully adhere each layer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
1. Verify that roof openings and penetrations are in place, set and braced.
2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and nailers match thicknesses of insulation.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 PREPARATION

A. Clean and prepare substrate according to manufacturer's written recommendations. Provide clean, dust-free, and dry substrate for roofing application.

B. Mask off adjoining surfaces not receiving roofing to prevent spillage from affecting other construction.

C. Protect roof drains and other deck penetrations to prevent spillage and migration of roofing fluids.

D. Remove grease, oil, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

E. Remove fins, ridges, and other projections and fill honeycomb, aggregate pockets, and other voids.

3.03 WOOD NAILERS AND FLASHING SUBSTRATES

A. Treated wood nailers shall be installed as indicated on Drawings.

1. Refer to Section 06 1053 - Miscellaneous Rough Carpentry.

B. The thickness of the nailer shall be such that the top of the nailer is flush with the surface to which the membrane is to be applied.

3.04 FASTENERS

A. Fasteners used to secure components of the roof system shall be accepted by the manufacturer of the membrane being installed.

B. The fastener assembly shall be installed as specified to avoid abrasion to the membrane.

C. The fastener manufacturer's recommendations shall be followed for:

1. Fastener suitability for specific applications
2. Proper drill bit for drilling correct hole size diameter and depth.
3. Minimum depth of embedment into deck to achieve required resistance to pull out.
4. Fastener length to provide proper fastening into deck.
5. Installation tools

D. Fasteners that are improperly installed shall be removed or corrected. Improper application may be characterized as:

1. Overdriven: Fastener is driven to the point that it is causing the stress distribution surface to become concave or deformed in the case of batten strips; excessive driving may cause failure by disengaging the fastener threads from the deck.

2. Under-driven: Fastener head is not properly seated on the stress distribution surface.
3. Snapped: Fastener breaks under the driving load.
4. Bent: Fastener is bent to the point that it adversely affects the installation.
5. Not engaged: Fastener is improperly located or is of insufficient length.

3.05 INSULATION INSTALLATION

A. General: Comply with insulation manufacturer's instructions and recommendations for the handling installation, and bonding or anchorage of insulation to substrate. Install one or more layers of insulation under area of roofing to achieve slope for drainage.
   1. Standing water on the finished roof system surface is unacceptable. Contractor to field verify conditions and ensure positive slope for drainage is provided.
   2. Do not crush tapered insulation crickets during roof system installation.
   3. Omit where attic space below is insulated in accordance with applicable codes. Where omitted provide flat and tapered insulation as required for roof drainage tapered crickets.

B. Over Metal Decks:
   1. Insulation shall be attached utilizing specified fasteners and plates using spacing, and patterns required to meet specified wind uplift, and building code requirements.
   2. Following attachment of first/base layer of insulation, it is acceptable for insulation to be attached utilizing specified insulation and cover board adhesive using bead sizes, spacing, and patterns required to meet specified wind uplift, and building code requirements.
   3. Where tapered polyisocyanurate rigid insulation does not transition to zero thickness at bottom of slope, install specified tapered edge trips to provide smooth transition. Set tapered edge strips in insulation adhesive as specified.

C. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/16 inch with insulation.

D. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

E. Tapered Insulation Crickets:
   1. Install tapered insulation crickets and sumps as required to provide positive slope for drainage. Provide sumps at all primary roof drains.
   2. Tapered insulation crickets shall be attached utilizing specified fasteners and plates using spacing, and patterns required to meet specified wind uplift, and building code requirements.
   3. It is acceptable for tapered insulation crickets to be attached to insulation boards by utilizing specified insulation and cover board adhesive using bead sizes, spacing, and patterns required to meet specified wind uplift, and building code requirements.

3.06 ROOF DRAIN SUMPS

A. Provide tapered insulation sump at primary roof drains using preformed tapered sump panels. Minimum sump size is 4 by 4 feet centered on roof drain. Shaved insulation sumps not permitted.

1. Where clear 4 by 4 foot roof area is interrupted by other penetrations, walls, and obstructions/interruptions; provide minimum 2 by 2 foot sump as recommended by roof membrane manufacturer for conditions.

B. Comply with roof membrane system manufacturers installation instructions.

3.07 COVER BOARD INSTALLATION

A. General: Comply with cover board manufacturer’s instructions and recommendations for the handling installation, and bonding or anchorage of cover board to substrate.

B. Over Metal Decks:

1. Cover board shall be attached utilizing specified fasteners and plates using spacing, and patterns required to meet specified wind uplift, and building code requirements.
2. It is acceptable for cover board to be attached utilizing specified insulation and cover board adhesive using bead sizes, spacing, and patterns required to meet specified wind uplift, and building code requirements.

3.08 MECHANICAL UNIT INSULATION CRICKETS

A. Install crickets on high slope side of all mechanical unit curbs using specified insulation and roof system components.

B. New minimum cricket slope shall be double the slope of directly adjacent sloped roof membrane surfaces.

3.09 TPO MEMBRANE APPLICATION, GENERAL

A. Install TPO roof system in accordance with membrane manufacturer requirements and recommendations as required for specified roof system warranty and performance requirements. Comply with specified requirements. Where conflict in requirements exists, the more stringent requirement shall apply.

B. Heat weld the TPO membrane seams and laps using an Automatic Heat Welding Machine or Hot Air Hand Welder in accordance with the manufacturer's specifications. At all splice intersections, roll the seam with a silicone roller immediately after the welder causes the membrane step off to ensure a continuous hot air welded seam.

C. All splice intersections shall be overlaid with pre-fabricated T Joint Covers.

D. Probe all seams once the hot air welds have thoroughly cooled.

E. Repair all seam deficiencies the same day they are discovered.

F. Apply Cut Edge Sealant on all cut edges of reinforced membrane where the scrim reinforcement is exposed after seam probing is complete. Cut Edge Sealant is not required on vertical splices.

3.10 FULLY ADHERED TPO ROOFING INSTALLATION

A. Start installation of roofing in presence of roofing system manufacturer's technical personnel.

B. Fully adhere fasten roofing over area to receive roofing according to roofing system manufacturer's written instructions. Unroll roofing and allow to relax before retaining.

C. Accurately align roofing, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

D. Mechanically fasten roof membrane securely at terminations, penetrations, and perimeter of roofing.

E. Apply roofing with side laps shingled with slope of roof deck where possible.

F. Seams: Clean seam areas, overlap roofing, and hot-air weld side and end laps of roofing and sheet flashings according to manufacturer's written instructions to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet.
2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
3. Repair tears, voids, and lapped seams in roofing that do not comply with requirements.

G. Spread sealant bed over deck-drain flange at roof drains, and securely seal roofing in place with clamping ring.

3.11 TPO BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.

1. ALL BASE FLASHING MEMBRANE MUST BE FULLY ADHERED with membrane set in full coverage application of membrane bonding adhesive. Self adhered cover tapes are acceptable.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate with termination bars.

3.12 TPO WALKWAY INSTALLATION

A. Provide walkway protection continuously as shown on Drawings and as specified. Provide manufacturer recommended breaks to permit water flow.

B. Heat weld to substrate or adhere walkway protections products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.13 LIGHTNING PROTECTION, EQUIPMENT, PIPE, CONDENSATION LINE, SPLASHBLOCKS, AND OTHER ROOF SURFACE BEARING ITEMS

A. Heat weld or adhere protection membrane products to roof membrane surface with compatible adhesive according to roofing system manufacturer's written instructions.

B. Adhere support or bearing item directly to protection membrane with specified Universal Adhesive.

C. Comply with roof membrane system manufacturer recommendations and requirements for item being supported, including maximum bearing weights. Do not crush, damage or deform deform roof system components.

D. Splashblocks not permitted, provide two layer membrane protection a specified in this Section.

3.14 ROOF DRAINAGE COMPONENTS

A. Flash all roof drainage components such as drains and scuppers in accordance with membrane manufacturer details for specified warranty.

3.15 PENETRATIONS

A. Flash all penetrations with specified fluid applied flashing membrane in accordance with membrane manufacturer details for specified warranty. Prefabricated boots and pitch pans not permitted.

3.16 FLUID APPLIED FLASHING MEMBRANE INSTALLATION

A. General:

1. For use only at roof penetrations and at low base flashings less than 8 inches above finished roof surface. Coordinate with manufacturer requirements for specified warranty.
2. Refer to roof membrane system manufacturer installation instructions.
3. New fluid applied roof membrane installation shall be fully reinforced.

B. Install in accordance with membrane manufacturer details for specified warranty, and as follows:

1. Prepare substrates in accordance with manufacturer instructions.

2. Provide single component urethane sealant bead, approved for use by fluid applied flashing manufacturer, at all horizontal to vertical transitions.
3. Extend minimum 6 inches onto TPO field membrane and minimum 6 inches up vertical substrate.

3.17 ROOF SYSTEM CONTROL AND EXPANSION JOINTS

A. Provide control and expansion joints at intervals and locations recommended by roof membrane system manufacturer. This requirements includes joint recommendations based on roof size and is independent of requirements for roof expansion joints located at building expansion joints indicated on project Drawings.

3.18 WATER CUT-OFF

A. At the end of each day's work, and when precipitation is eminent, a water cut-off shall be constructed at all open edges. Cut-off must be able to withstand extended periods of wet weather, not impede water drainage from roof areas, and prevent water from entering the building. The water cut-off shall be completely removed prior to resuming the installation of the roofing system.

3.19 FIELD QUALITY CONTROL

A. Manufacturer Field Technical Representative: Contractor shall engage manufacturer's qualified field technical representative during the Work to perform tests and inspections, including documenting of materials of this Section prior to concealment.
   1. The manufacturer's technical representative is to provide a minimum of one interim inspection
   2. One final inspection.

B. Third Party Inspector: Contractor shall engage a qualified testing agency to inspect substrate conditions, surface preparation, material application, protection, and components, and to furnish reports to Architect and materials manufacturer.
   1. Additional testing requirements shall be as recommended by Third Party Inspector and as approved by Architect.

C. Field Testing: Provide field testing in accordance with the following:
   1. ASTM C1153 - Standard Practice for Location of Wet Insulation in Roofing Systems Using Infrared Imaging.
   2. System shall pass with no thermal anomalies indicating trapped moisture. Where system does not pass, correct defective applications in accordance with the requirements of this Section.
   3. Additional testing requirements shall be as recommended by Third Party Inspector and as approved by Architect.

D. Coordination of Inspections: Cooperate with testing and inspection entities. Allow access to work areas and staging. Notify testing agency in writing of schedule for Work of this Section to allow sufficient time for testing and inspection.

E. Notify manufacturer, third party inspectors, Owner, and Architect in advance of times when lift devices and scaffolding will be relocated. Do not relocate lift devices and scaffolding until all parties have reasonable opportunity to make observations of work areas at lift device or scaffold location.

F. Reporting: Forward written inspection reports to the Architect within 10 working days of the inspection and test being performed.

G. Correction: Correct deficient applications not passing tests and inspections, make necessary repairs, and retest as required to demonstrate compliance with requirements.

H. Defects and Repairs: Contractor shall be solely responsible for repair of defective areas.

I. Repair Verification: Number and log each patch repair. Photograph work from multiple angles to adequately demonstrate extent and final result of work. Arrange for reinspection as directed by Architect.

3.20 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

END OF SECTION

SECTION 07 6200

SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Contractor shop-fabricated roof related sheet metal items, including the following:
   1. Miscellaneous flashings, counterflashings, and trim at roof transitions and terminations.
   2. Gutters.
   3. Downspouts.

B. Wall flashing assemblies, including the following:
   1. Prefabricated two piece surface mounted counterflashings.
   2. Prefabricated reglet counterflashings.
   3. Through wall flashing assemblies:
      a. Prefabricated through wall flashing components.
      b. Contractor shop-fabricated through wall flashing components.

C. Miscellaneous sheet metal fabrications, including the following:
   1. Sheet metal components required at miscellaneous interior and exterior locations in conjunction with installation of other products, materials, and systems for use on this Project.
   2. May include, but is not limited to the following; sheet metal transitions, covers, trims, and flashings at interior and exterior locations.

D. Miscellaneous items for use with other Work of this Section:
   1. Precast concrete splash pads/splash blocks.

E. Specialty rain chain gutter accessory, refer to project Landscape design Drawings.

1.03 REFERENCES

A. Reference Standards:
   1. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
   2. Sheet Metal and Air Conditioning Contractors National Association (SMACNA) - Architectural Sheet Metal Manual (ASMM).

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

1. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
2. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.
3. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.
4. Review sheet metal flashing observation and repair procedures after flashing installation.

B. Attendees shall include contractor, sheet metal system installer, roof system installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: For each of the following

1. Underlayment materials.
2. Each type of sheet metal.
3. Sheet metal painted finishes.
4. Elastomeric sealant.
5. Butyl sealant.
6. Splash blocks.

C. Shop Drawings: For miscellaneous sheet metal fabrications including flashings and trim.

1. Include plans, elevations, sections, and attachment details. Minimum scale for elevations shall be 1-1/2 inch equals one foot. Minimum scale for sections and details shall be 3 inches equals one foot.
2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled Work.
3. Include identification of material, thickness, weight, and finish for each item and location in Project.
4. Include details for forming, including profiles, shapes, seams, and dimensions.
5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern/location of seams.

6. Include details of termination points and assemblies.
7. Include details of special conditions.
8. Include details of connections to adjoining work.

D. Shop Drawings: For roof system edge metal fabrications including gravel stops and fascia.
1. Include contractor shop formed low slope roof system metal fascia and gravel stops.
a. Provide evidence of compliance with current ANSI SPRI ES-1 standards for project specific building codes.
2. Include plans, elevations, sections, and attachment details. Minimum scale for elevations shall be 1-1/2 inch equals one foot. Minimum scale for sections and details shall be 3 inches equals one foot.
3. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled Work.
4. Include identification of material, thickness, weight, and finish for each item and location in Project.
5. Include details for forming, including profiles, shapes, seams, and dimensions.
6. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern/location of seams.
7. Include details of termination points and assemblies.
8. Include details of special conditions.
9. Include details of connections to adjoining work.

E. Samples: For each exposed product and for each color and texture specified, 12 inches long by minimum 4 inches.

F. Qualification Data: For fabricator of exterior sheet metal items. Provide written evidence of metal fabrication shop compliance with ANSI-SPRI ES-1 shop certification as required to provide ANSI-SPRI wind rated sheet metal fabrications. Provide copy of most recent shop certification along with a copy of current ANSI-SPRI ES-1 shop certification requirements.

G. Sample Finish Warranty: For example of Finish Warranty proposed for use on this project.

H. Sample Installer Warranty: For example of installing contractor's Warranty proposed for use on this project.

I. Manufacturer Special Warranty: Provide example of Manufacturer Special Warranty.

1.06 CLOSEOUT SUBMITTALS

A. Installer Special Warranty: Provide executed installing contractor's Special Warranty.

B. Special Manufacturer Finish Warranty: Provide executed Manufacturer Special Warranty.

C. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

1.07 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

B. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.
   1. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
   2. Protect stored sheet metal flashing and trim from contact with water.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.09 WARRANTY

A. Installer Warranty: Standard Installers warranty covering defects resulting from materials and workmanship for the Work of this Section.
   1. Warranty Period: One year from date of Substantial Completion.

B. Special Manufacturer Finish Warranty: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
      b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. General: Provide components and systems designed to resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

B. Material Compatibility: Provide materials that are compatible with one another under conditions of service and application required.

C. Wind Resistance: Exterior systems and components shall comply with applicable Building Code requirements including ANSI-SPRI/ES-1.

2.02 MANUFACTURERS

A. Sheet Metal Manufacturers: Subject to compliance with requirements.

1. Atas International, Inc.: www.atas.com
2. Berridge Manufacturing Co. www.berridge.com
3. Englert, Inc. www.englertinc.com.
4. McElroy Metal: www.mcelroymetal.com
5. MBCI Metal Roof and Wall Systems, Division of NCI Group, Inc. www.mbci.com
6. Morin, a Kingspan Group Company. www.morincorp.com
7. Petersen Aluminum Corp: www.pac-clad.com

2.03 METAL SHEET MATERIALS - GENERAL REQUIREMENTS

A. Provide sheet materials in type, thickness, finish, and locations indicated on Drawings.

B. Galvanized Steel, Factory Finished: ASTM A653/A653M, with G90/Z275 zinc coating.

1. Thickness: 14 ga/.0785 inch/1.9939 mm.
2. Thickness: 16 ga/.0635 inch/1.6129 mm.
3. Thickness: 18 ga/.0516 inch/1.310 mm.
4. Thickness: 20 ga/.0396 inch/1.005 mm.
5. Thickness: 22 ga/.0336 inch/.853 mm.
6. Thickness: 24 ga/.0276 inch/.701 mm.
7. Finish: Factory applied PVDF (Polyvinylidene Fluoride) coating; superior performance organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.

C. Aluminum, Factory Finished: ASTM B209 (ASTM B209M).

1. Thickness: 12 ga/.08081 inch/2.053 mm.
2. Thickness: 14 ga/.06408 inch/1.628 mm.
3. Thickness: 16 ga/.05082 inch/1.291 mm.
4. Thickness: 18 ga/.04030 inch/1.024 mm.
5. Thickness: 20 ga/.03196 inch/.812 mm.
6. Thickness: 22 ga/.02535 inch/.644 mm.
7. Finish: Factory applied PVDF (Polyvinylidene Fluoride) coating; superior performance organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.

D. Stainless Steel, Mill Finish: ASTM A666, Type 304 alloy, soft temper.
   1. Thickness: 18 ga/.050 inch/1.270 mm.
   2. Thickness: 20 ga/.0375 inch/.9525 mm.
   3. Thickness: 22 ga/.03125 inch/.7937 mm.
   4. Finish: Type 2B - Mill finish.

2.04 CONTRACTOR FORMED ROOF SYSTEM MISCELLANEOUS SHEET METAL FABRICATIONS

A. Miscellaneous Flashings, Trims, and Counterflashings:
   1. Aluminum, factory finished.
      a. Thickness: In accordance with SMACNA recommendations. Minimum 0.040 inch thickness. Provide thicker gage as required to meet Performance Requirements and Warranty article of this Section.
   2. Style:
      a. As indicated on Drawings.
   3. Dimensions:
      a. Size as indicated on Drawings. Where not indicated, as selected by Architect. Coordinate with SMACNA recommendations.
   4. Fabrication:
      a. General: Fabricate items to meet Performance Requirements article of this Section.
   5. Securement: As required to comply with wind uplift resistance requirements. Exposed fasteners shall be EPDM gasketed high-domed fasteners with integral fastener head and washer configuration (no separate washers).
   6. Nailers: Provide minimum 1-1/2 thick nailers at all miscellaneous sheet metal locations. Provide multiple layers as needed. Multiple layers of 3/4 inch pressure treated plywood is acceptable. Coordinate with requirements for wind uplift resistance.
   7. Expansion Joints: Provide lap type expansion joint only. Fabricate in accordance with SMACNA recommendations. Provide full bed silicone sealant in joints.
   8. Color: As selected by Architect from manufacturer's full range of colors.

B. Trim and Fascia: For steep slope roof systems.
   1. Aluminum, factory finished.
      a. Thickness: In accordance with SMACNA recommendations.
      b. Minimum 0.040 inch thickness. Provide thicker gage as required to meet Performance Requirements article of this Section.
   2. Style:
      a. As indicated on Drawings. Where not indicated, as selected by Architect.
   3. Dimensions:

a. Size as indicated on Drawings.

4. Fabrication:
   a. General: Fabricate items to meet Performance Requirements article of this Section.
   b. Fascia and Edge Trim: Fabricate in dimensions indicated on Drawings and in accordance with SMACNA Chapter 2 recommendations for style indicated. Where discrepancy exists, clearly indicate on Shop Drawings for Architect review and approval.
      1) Provide drip edge at sheet metal vertical bottom termination. Refer to SMACNA Chapter 2.
      2) Provide continuous cleat at sheet metal vertical bottom termination. Refer to SMACNA Chapter 2 and coordinate with requirements for wind uplift resistance.
      3) Provide staggered cleat nailing pattern. Refer to SMACNA Chapter 2 and coordinate with requirements for wind uplift resistance.
      4) Configuration: Coordinate with configuration indicated on Drawings. Basis of design shall be SMACNA Figure 2-1 or Figure 2-6 as required to comply with wind uplift resistance requirements
5. Securement: As required to comply with wind uplift resistance requirements. Exposed fasteners on exterior faces are not permitted. Where fasteners on interior faces are required to meet wind uplift resistance requirements, provide EPDM gasketed high-domed fasteners with integral fastener head and washer configuration (no separate washers).
6. Nailers: Provide solid wood substrate capable of providing required fastener withdrawal pullout resistance of ANSI/SPRI ES-1. Coordinate with requirements for wind uplift resistance.
7. Color: As selected by Architect from manufacturer's full range.

2.05 ROOF SYSTEM SHEET METAL DRAINAGE ITEMS

A. Refer to SMACNA, Architectural Sheet Metal Manual; Current Edition.

B. Gutters:
   1. Aluminum, factory finished.
      a. Thickness: In accordance with SMACNA Manual Table 1-5, "Recommended Minimum Gages for Gutter" recommendations.
      b. Minimum 0.040 inch thickness, unless noted otherwise.
   2. Style:
      a. Rectangular, Style A (i.e. box shape).
   3. Dimensions:

a. Size as indicated on Drawings and in accordance with applicable building code drainage component sizing requirements.

b. Fabrication dimensions in accordance with SMACNA recommendations for style indicated.

4. Expansion Joints: Provide lap type expansion joint only. In accordance with SMACNA Figure 1-6, "Lap Style Gutter Expansion Joint".

5. Color: As selected by Architect from manufacturer's full range.

C. Gutter Support Brackets:

1. Aluminum, factory finished.

a. Thickness: In accordance with SMACNA Manual Table 1-5, "Recommended Minimum Gages for Gutter" recommendations.

b. Minimum 0.040 inch thickness.

2. Width:

a. Minimum 1 inch wide.

3. Color: As selected by Architect from manufacturer's full range.

D. Gutter Top Spacers:

1. Aluminum, factory finished.

a. Thickness: In accordance with SMACNA Manual Table 1-5, "Recommended Minimum Gages for Gutter" recommendations.

b. Minimum 0.040 inch thickness.

2. Width:

a. Minimum 1 inch wide.

3. Color: As selected by Architect from manufacturer's full range.

E. Downspouts:

1. Aluminum, factory finished.

a. Thickness: In accordance with SMACNA Manual Table 1-5, "Recommended Minimum Gages for Gutter" recommendations.

b. Minimum 0.040 inch thickness, unless noted otherwise.

2. Style:

a. Rectangular "box" style.

b. In accordance with SMACNA Figure 1-32B.

3. Color: As selected by Architect from manufacturer's full range.

F. Downspout Hangers:

1. Aluminum, factory finished.

a. Thickness: In accordance with SMACNA Manual Table 1-5, "Recommended Minimum Gages for Gutter" recommendations.

b. Minimum 0.040 inch thickness, unless indicated otherwise.

2. Width:
   a. Minimum 1 inch wide.
3. Style:
   a. As indicated on Drawings.
   b. In accordance with SMACNA Figure 1-35G.
4. Color: As selected by Architect from manufacturer's full range.

G. Splash Pads: Factory pre-cast/pre-fabricated concrete from minimum 3000 psi at 28 day concrete with minimum 5 percent air entrainment. Contractor shop fabricated is not acceptable.
   1. Profile: Four sided rectangle with one side open for drainage.
      a. Edge Height: Provide 2 inch raised edges on three sides.
      b. Edge Radius: Radius top edges 1/2 inch. Maximum 1/8 radius on bottom edges.
   2. Size: 12 inches wide by 30 inches long with open side for drainage on one short side.

2.06 THROUGH WALL FLASHING

A. Applicable where indicated on Drawings and as follows:
   1. Flexible flashing: Waterproof material typically used in cavity wall construction to contain and assist in the proper water drainage that may penetrate wall system veneer. Other materials may be required to constitute the system.
   2. Head and sill flashing: Same as flexible flashing.
   3. Through-wall flashing: Generally considered the same as flexible flashing. Also applicable to full width cap flashing under non-metal copings or wall caps.
   4. Waterproofing transition membrane to below grade.

B. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 316, 0.0187 inch (0.5 mm) thick, and Series 300 stainless-steel fasteners. For use at through wall flashings.
   1. Description: One piece assembly, minimum 10 foot lengths, with factory-fabricated mitered corners and transitions.
   2. Material: Stainless steel.
   3. Finish: No further finish required.
   4. Accessories: Custom fabricated interior and exterior corners and splice plates.

C. Self Adhered Through Wall Transition Flashing Membrane: For use within wall assemblies, where indicated.
   1. Basis of Design: Provide product by air and water barrier system manufacturer. Coordinate with the requirements of Section 07 2726 - Fluid Applied Air and Water Barriers.
   2. Acceptable Manufacturers: Subject to compliance with requirements.

a. GCP Applied Technologies. www.gcpat.com

b. Henry Co. www.henry.com

c. Prosoco, Inc. www.prosoco.com

d. Tremco, Inc. www.tremcosealants.com

3. Self Adhered Modified Bitumen Rubberized Asphalt Flashing: Self-adhering polymer modified asphalt sheet; 40 mils (0.040 inch) minimum total thickness; 8 mil cross-laminated polyethylene bonded to adhesive rubberized asphalt, with a removable release liner.

4. Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, of trowel grade or low viscosity.

D. Drip Edge: To be extended to daylight exposure.

1. Stainless Steel, Type 316.

2. 3 inches by 8 feet with 30-degree downward angled, factory formed, integral 1/4-inch exposed daylight drip, measured parallel to drip slope.

E. Metal Termination Bars: Aluminum bars, approximately 1 by 1/8 inch, predrilled at 9-inch centers.

F. Sealants: For sealants at through wall flashings refer to the requirements of Section 07 9200 - Joint Sealants.

2.07 PREFABRICATED WALL FLASHING SYSTEM - TWO PIECE CONFIGURATION

A. For use only where indicated on Drawings.

B. Characteristics:

1. Two-piece counterflashing assembly, minimum 10 foot lengths, with factory-fabricated mitered corners and transitions.

a. One piece wall counterflashings not permitted.

b. Surface mounted or with reglet embedded into wall joint.

2. Material: Aluminum, factory finished, minimum .050 inch thickness.

3. Accessories: Prefabricated interior and exterior corners and splice plates.

C. Acceptable Products:

1. Fry Reglet Corp., Springlok two-piece reglets and counterflashing, CO Reglet at concrete walls, MA Reglet at masonry walls, ST Reglet at stucco walls, SM Reglet at surface-mounted conditions.

2. Metal-Era, Inc., two-piece reglets and counterflashing, 2-Piece Counterflashing Reglet Version at concrete walls and masonry walls, 2-Piece Counterflashing Thru-Wall Version at stucco walls, 2-Piece Counterflashing Surface-Mounted Version at surface-mounted conditions.

3. OMG, Inc., two-piece reglets and counterflashing, Drive-Lock In-Wall Counter Flashing at concrete walls and masonry walls, and stucco walls, Drive-Lock To-Wall Reglet at surface-mounted conditions.

2.08 MISCELLANEOUS SHEET METAL TRIM, FLASHINGS, AND COVERS

A. For use at miscellaneous interior and exterior locations where additional sheet metal trim, flashings, and covers are needed to provide a complete system and are not provided by specified primary product manufacturer.

B. Provide sheet metal in type and gage recommended by primary product manufacturer that sheet metal is being installed in conjunction with.

C. Sheet metal shall be compatible with adjacent substrates. Refer to SMACNA Appendix B - Metals Applications, and Appendix C - Galvanic Corrosion. Where conflict exists notify Architect.

D. Fabricate and install in accordance with applicable codes and standards and in accordance with SMACNA recommendations for specific application.

E. Minimum Thicknesses For Flatness: As noted and in accordance with Table 5, page L.2 of SMACNA manual, where SMACNA requirement is more stringent.

1. Galvanized Steel.
    a. Exposed Face, up to 4 inches: 22 ga (0.034" 0.9 mm)
    b. Exposed Face, >4 to 8 inches: 22 ga (0.034" 0.9 mm)
    c. Exposed Face, >8 to 10 inches: 22 ga (0.034" 0.9 mm)
    d. Exposed Face, >10 to 16 inches: 20 ga (0.040" 1.0 mm)
2. Formed Aluminum.
    a. Exposed Face, up to 4 inches: 0.040" (1.0 mm)
    b. Exposed Face, >4 to 8 inches: 0.050" (1.3 mm)
    c. Exposed Face, >8 to 10 inches: 0.063" (1.6 mm)
    d. Exposed Face, >10 to 16 inches: 0.080" (2.0 mm)
3. Stainless Steel.
    a. Exposed Face, up to 4 inches: 26 ga (0.016" 0.4 mm)
    b. Exposed Face, >4 to 8 inches: 26 ga (0.016" 0.4 mm)
    c. Exposed Face, >8 to 10 inches: 24 ga (0.023" 0.6 mm)
    d. Exposed Face, >10 to 16 inches: 22 ga (0.029" 0.7 mm)

F. Profile: As indicated on Drawings.

G. Color: As selected by Architect from manufacturer full range including custom colors as required to match adjacent metal or other material finish.

2.09 STANDING SEAM METAL ROOF STEP FLASHING

A. Provide minimum .050 prefinished aluminum step flashing at locations indicated on Drawings and at vertical wall surfaces directly adjacent to metal roof rake slope.

1. Color: As selected by Architect from manufacturer full range. Design intent is to match adjacent metal roof finish.

B. Configuration: In accordance with Drawings and SMACNA recommendations.

2.10 ACCESSORIES

A. Exterior Assembly Fasteners: Fasteners in exterior assemblies shall be stainless steel unless not galvanically compatible with adjacent materials or not permitted by assembly manufacturer.

B. Fasteners for Stainless Steel: Stainless steel.

1. Nails: Flat head, needle point, not less than 12 ga. and of sufficient length to penetrate substrate 1 inch minimum.
2. Expansion shields: Lead or bronze sleeves.
3. Screws: Self-tapping type, with round heads.
4. Bolts: Furnished complete with nuts and washers.
5. Rivets: Round head, solid type.
6. Blind clips and cleats: Same gauge as sheet metal.

C. Fasteners: Provide fasteners compatible with sheet metal being fastened and in accordance with SMACNA recommendations.

D. Fasteners for Aluminum: Aluminum or Galvanized Steel.

1. Nails: Flat head, needle point, not less than 12 ga. and of sufficient length to penetrate substrate 1 inch minimum.
2. Expansion shields: Lead or bronze sleeves.
3. Screws: Self-tapping type, with round heads.
4. Bolts: Furnished complete with nuts and washers.
5. Rivets: Round head, solid type.
6. Blind clips and cleats: Same gauge as sheet metal.

E. Primer: Zinc chromate type.

F. Concealed Sealants: Non-curing butyl sealant. Refer to the requirements of Section 07 6200.

G. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.

H. Comply with the requirements of Section 07 9200 - Joint Sealants.

I. Self Adhered SBS Underlayment:

1. For use as follows:
    a. Where indicated on Drawings.
    b. Beneath all new copings.
    c. In lieu of bituminous paint, for protection between dissimilar materials, and for protection between dissimilar metals to prevent galvanic corrosive action.
2. Not for use as self adhered metal roof underlayment. Refer to metal roof roof specification section.
3. Approved products:
    a. Mid-States “Quick-Stick” HT.
    b. W R Grace "Ice & Water Shield HT.
    c. Henry “Blueskin PE 200 HT”.
    d. Carlisle Coatings and Waterproofing, Inc., "WIP 300HT".

J. Bituminous Paint/Coating: Refer to Section 07 1115 - Protective Bituminous Paint Coating.

1. Coordinate with requirements of product/material manufacturer(s) of this Section.
2. For use as corrosion protection between dissimilar materials.
3. Apply in two coats for full coverage minimum 30 dry mil thickness, unless indicated otherwise.

2.11 FABRICATION - GENERAL

A. Fabricate in accordance with SMACNA, Architectural Sheet Metal Manual; Current Edition. The most stringent recommendation shall apply unless noted otherwise.

B. Fabricate sheet metal work in accordance with approved shop drawings and applicable standards. Form sheet metal work with clear, sharp and uniform edges. Hem exposed edges. Form curved components to radius indicated on the drawings, without deformation in metal.

C. Form sections true to shape, accurate in size, square, and free from distortion or defects.

D. Form pieces in longest possible lengths.

E. Hem exposed edges on underside 1/2 inch; miter and seam corners.

F. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

G. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.

H. In aluminum sheets less than 0.040 inch thick, make joints using flatlock seams, 3/4 inch in width. Fill seams with exterior sealant. Make joints in thicker sheets using seaming or by Tungsten Arc Welding (TIG) or Gas Metal Arc Welding (MIG) processes, using appropriate filler alloy.

I. Provide linear sheet metal items in 10 foot by 12 foot sections, except as otherwise noted. Form flashing using single pieces for the full width. Provide shop-fabricated, one-piece corners and transition pieces, with maximum 2 foot long legs.

J. Make riveted joints using solid shank rivets or pop rivets as applicable. Pop rivets shall be closed end type.

2.12 FABRICATION - DRAINAGE COMPONENTS

A. Size for rainfall intensity determined by applicable codes.

B. Anchorage and Fasteners: Use appropriate fastener for substrate and in accordance with applicable codes and SMACNA recommendations.

2.13 FINISHES, ALUMINUM - FACTORY PAINTED/PREFINISHED

A. General:

1. Finish of all permanently exposed areas of aluminum components shall be applied in accordance with the appropriate AAMA Voluntary Guide Specification indicated.

2. Permanently Concealed Finishes: Factory mill finish. All other permanently exposed surfaces shall be factory painted/prefinished.

B. Factory Painted/Pre-Finished Finish Options: Provide one of the following.

1. FEVE Superior Performance Organic Powder Coating: Conforming to AAMA 2605 and as follows:

a. Fluoroethylene vinyl ether (FEVE): Superior performance IFS 100% FEVE resin based fluoropolymer powder coated finish. Zero VOC formulation.

b. Coats: Minimum one coat finish over aluminum with primer as required by coating manufacturer to comply with specified requirements

c. Scratch resistance shall meet or exceed a pencil test of H in accordance with (ASTM D3363), “Standard Test Method for Film Hardness by Pencil Test”.

d. Abrasion resistance shall meet or exceed a Taber abrasion test of 1000 rotations in accordance with (ASTM D4060), “Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser”.

2. PVDF (Polyvinylidene fluoride) Superior Performance Organic Multi-Coat System: Complying with AAMA 2605; and as follows:

a. Including at least 70 percent PVDF, FSF-free resin, and having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch (0.030 mm).

b. Coats: Minimum two coat finish with primer as required by coating manufacturer to comply with specified requirements

c. Finish Type: Arkema Group, Kynar 500, Sherwin Williams Fluropon, PPG Duranar, or Solvay Solexis, Inc., Hylar 5000 resin (Polyvinylidene fluoride, PVDF), formulated by a licensed manufacturer and applied by manufacturer's approved applicator to meet AAMA 2605.

3. Color: As selected by Architect from manufacturer full range including custom colors as required to match adjacent metal or other material finish.
4. Touch-Up Materials: As recommended by finish manufacturer for field application.

2.14 FINISHES, STEEL - FACTORY PAINTED/PREFINISHED

A. General:
1. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
a. Finish of all permanently exposed areas of steel components shall be applied in accordance with the appropriate AAMA Voluntary Guide Specification indicated.
2. Permanently Concealed Finishes: Factory mill finish. All other permanently exposed surfaces shall be factory painted/prefinished.

B. Factory Painted/Pre-Finished Finish Options: Provide one of the following.
1. FEVE Superior Performance Organic Powder Coating: Conforming to AAMA 2605 and as follows:
a. Fluoroethylene vinyl ether (FEVE): Superior performance IFS 100% FEVE resin based fluoropolymer powder coated finish. Zero VOC formulation.
b. Coats: Minimum two coat finish over steel with primer as required by coating manufacturer to comply with specified requirements
c. Scratch resistance shall meet or exceed a pencil test of H in accordance with (ASTM D3363), “Standard Test Method for Film Hardness by Pencil Test”.
d. Abrasion resistance shall meet or exceed a Taber abrasion test of 1000 rotations in accordance with (ASTM D4060), “Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser”.
2. PVDF (Polyvinylidene fluoride) Superior Performance Organic Multi-Coat System: Complying with AAMA 2605; and as follows:
a. Including at least 70 percent PVDF, FSF-free resin, and having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch (0.030 mm).
b. Coats: Minimum two coat finish with primer as required by coating manufacturer to comply with specified requirements.
c. Finish Type: Arkema Group, Kynar 500, Sherwin Williams Fluropon, PPG Duranar, or Solvay Solexis, Inc., Hylar 5000 resin (Polyvinylidene fluoride, PVDF), formulated by a licensed manufacturer and applied by manufacturer's approved applicator to meet AAMA 2605.
3. Color: As selected by Architect from manufacturer full range including custom colors as required to match adjacent metal or other material finish.
4. Touch-Up Materials: As recommended by finish manufacturer for field application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify system and adjacent terminations and flashings are in place, sealed, and secure.

B. Coordinate with requirements, recommendations, and instructions of manufacturer of system adjacent to sheet metal components that will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of surfaces and conditions.

3.02 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Differential, non-compatible metal surfaces: Back paint concealed metal surfaces with protective backing paint to a minimum dry thickness of 30 mil using two 15 mil coat application.

3.03 INSTALLATION, GENERAL

A. Material Separation:

1. Dissimilar Metals: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with specified bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
2. Dissimilar Materials: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment separation and protection membrane.

B. Secure flashings in place using concealed fasteners.

C. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.

D. Seal metal joints watertight.

E. Seaming: Form seams in direction of flow. Aluminum seams shall be filled with exterior sealant. Lap seams occurring in members sloping 45 degrees or more than 4 inch, minimum; bed in flashing cement.

F. Secure sheet metal items using continuous cleats, clips and fasteners as indicated. Perform no exposed face fastening.

G. Fastening:

1. Nails: Confine to one edge only of flashing 1 foot or less in width. Space nails at 4 inch on-center, maximum. Provide neoprene washers for nails.
2. Cleats: Continuous, formed to profile of item being secured.
3. Clips: Minimum 2 inch wide by 3 inch long, formed to profile of item being secured. Space at 2 feet on-center, maximum.

H. Joints:

1. Form joints in linear sheet metal to allow for 1/2 inch minimum expansion at 12 feet on-center, maximum, and maximum 2 feet from corners.
2. Form plates to profile of sheet metal item.
3. Install 1 foot wide backup plate centered under joint. Set sheet metal over backup plate in two beads of specified silicone sealant, 1/4 inch in diameter, minimum.
4. For units with top width of 12 inches and wider, install 6 inch cover plate centered over joint. Set in two beads of specified silicone sealant, 1/4 inch in diameter, minimum.
5. Mate components for positive seal. Do not allow sealant to migrate onto exposed surfaces.

I. Exterior Fastener Holes and other Penetrations: Where fastener holes and other penetrations are created during installation of wall assemblies and not used (abandoned), fully seal hole with joint sealant and additional air/water barrier material in accordance with continuous air/water barrier manufacturer recommendations.

3.04 INSTALLATION - DRAINAGE COMPONENTS

A. Gutters:

1. Secure gutters in place with concealed fasteners.
2. Slope gutters 1/4 inch per 10 feet, minimum.
3. Fabricate and install in accordance with specified requirements and SMACNA "Architectural Sheet Metal Manual" (Current Edition) recommendations.
4. Hang gutters with high points equidistant from downspouts, evenly sloped toward downspouts.
    a. Support gutters in accordance with SMACNA Manual, Figure 1-13 for hanging gutters at low-slope roofs.

B. Downspouts:

1. Secure downspouts in place with concealed fasteners.
2. Fabricate and install in accordance with specified requirements and SMACNA "Architectural Sheet Metal Manual" (Current Edition) recommendations.
3. Secure downspouts to exterior walls at 18 inches on-center, maximum, using straps and fasteners appropriate for backup wall material configuration. Lap downspout joints 1-1/2 inches, minimum, and weld.
    a. Refer to SMACNA Manual, Figure 135C.

C. Splash Pads/Splash Blocks:

1. Provide at all locations where downspouts empty to grade. Set plumb and level to direct water away from exterior wall.
    a. Base at Slab-On-Grade Concrete Grade Locations: No additional requirement.
    b. Base at Non-Slab-On-Grade-Concrete Grade Locations: Provide washed, kiln-dried, paver base sand beneath splash pad to provide level, stable surface. Extend paver base minimum 3 inches beyond all sides of splash pads.
    c. Paver Base Product: Quickrete Patio Paver Base Sand or Pavestone Paver Base.
2. Provide at all locations where downspout empties onto lower roof or deck surface.
    a. Where downspouts empty onto lower roof surfaces, provide fully adhered sacrificial layer of membrane compatible with lower roof system; extend minimum 12 inches beyond splashblock perimeter on all sides.
    b. Adhere splash pad in specified single component urethane sealant.
    c. Do not install concrete splash pads on steep slope roofs.

3.05 THROUGH WALL FLASHING INSTALLATION

A. Provide through wall flashings at the following locations:

1. Base of all exterior walls.
2. All horizontal wall transitions between exterior cladding materials.
3. At the top of all door and window openings.
4. Other locations indicated on Drawings.

B. Fabricate and install in conjunction with flexible through wall flashing requirements of Section 07 2726 - Fluid Applied Air and Water Barrier Systems, or other air water barer system specification included for project. Comply with the following:

1. SMACNA 4.1 through 4.5 recommendations including related figures, most recent edition.

C. Install where indicated, specified, or required in accordance with flashing manufacturer's written instructions. Coordinate with exterior wall air and water barrier system installation requirements.

D. Extend flashing 6" minimum beyond openings. Fold flashing ends at end of openings or horizontal flashing terminations to form end dam or use pre-manufactured units made of minimum 26 gauge stainless steel.

E. Flashing width: Width required starting flush with outside face of exterior wythe, extending through cavity, rising height required to extend above lintel steel at least 2 inches.

F. Splice end joints by overlapping them a minimum of 2 inches and seal with a compatible sealant or metal splice tape.

G. Masonry or concrete backup wall:

1. Surface apply after air and water barrier installation in accordance with manufacturer's installation instructions.
2. Fasten the top of the flashings to the back up wall with a non-corrosive termination bar and seal the top edge with a compatible sealant.

H. Stud backup wall with sheathing:

1. Fasten the top of the flashings to the back up wall with a non-corrosive termination bar and seal the top edge with a compatible sealant.

I. Fold ends of flashing at end of opening to form dam; seal with polyether sealant or use purchased manufacturers preformed end dams.

J. Inside and outside corners: Fabricate in accordance with referenced SMACNA recommendations using corner and splice material or purchase manufactured corners from manufacturer.

K. Extend flexible through wall flashing onto stainless steel drip edge.

1. Terminate self adhered flexible through wall flashing transition membrane minimum 1 inch from exterior face of wall cladding. Transition membrane shall receive no exposure to daylight.
2. Extend stainless steel drip edge to daylight. Self adhered transition membrane flashing shall be fully adhered to drip edge and edge sealed with specified sealant. Seal seams in drip edge using specified sealant.

L. Cover flashing within a few days of installation to protect from damage from other trades and debris. If flashing is left unprotected and it is punctured, torn, or has loose scrim, repair or replace in accordance with manufacturer instructions.

3.06 CONTRACTOR SHOP FORMED FLASHINGS, GRAVEL STOP, FASCIA, AND TRIM

A. Install in accordance with specified requirements for wind resistance and warranties.

END OF SECTION

SECTION 07 7113

MANUFACTURED COPINGS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Factory fabricated and finished edge metal systems. This Section only applies to roof edge conditions identified on the Drawings as "copings" or "metal copings".
   1. For other miscellaneous roof edge metal and sheet metal fabrications, refer to Section 07 6200 - Sheet Metal Flashing and Trim.

B. Self adhered coping underlayment.

1.03 REFERENCES

A. Definitions:
   1. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.
   2. Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," before multiplication by a safety factor.
   3. Factored Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," after multiplication by a safety factor.

B. Reference Standards:
   1. Factory Mutual (FM).
   2. American National Standards Institute (ANSI)/Single Ply Roofing Industry (SPRI):
      a. ANSI/SPRI/FM 4435/ES-1 - Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

B. Attendees shall include contractor, coping installer, roof system installer, sheet metal installer, and installers of adjacent materials and systems.

C. Review the following:
   1. Materials.
   2. Installation.
   3. Adjusting.
   4. Cleaning.
   5. Protection.
   6. Coordination with other Work.

D. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Submit manufacturer's product data, including installation instructions.

C. Shop Drawings: Submit manufacturer's shop drawings, including plans, elevations, sections, and details, indicating dimensions, materials, components, fasteners, finish, and accessories.

D. Color Samples: Submit manufacturer's color samples of materials, consisting of complete color chart representing manufacturer's full range of available colors.
   1. Submit metal chips of specific colors as requested by the Architect.

E. Sample Warranty:
   1. Sample manufacturer warranty meeting the specified warranty requirements for this project.
   2. Where edge metal is included in roof system warranty provide sample copy of roof system warranty indicating coverage.

F. Florida Product Approval: Provide certification of compliance with Florida product approval as indicated in section 01 6000 and as required by applicable Florida Building Code.

1.06 QUALITY ASSURANCE

A. Florida Product Approval: Exterior products and systems shall comply with Florida Building Code as indicated in Section 01 6000 including Florida Product Approval requirements.

B. Manufacturer's Qualifications: Manufacturer regularly engaged in the manufacturing of materials of similar type to that specified for a minimum of 10 years.

C. Installer's Qualifications:
   1. Installer regularly engaged in installation of materials of similar type to that specified for a minimum of 5 years.
   2. Use persons trained for installation of materials of similar type to that specified following manufacturer's installation instructions.

D. Testing: Meet specified testing requirements.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Delivery Requirements: Deliver materials to site in manufacturer’s original, unopened containers and packaging.

B. Storage and Handling Requirements:

1. Store and handle materials in accordance with manufacturer’s instructions.
2. Keep materials in manufacturer’s original, unopened containers and packaging until installation.
3. Store materials in clean, dry area indoors.
4. Do not store materials directly on floor or ground.
5. Protect materials and finish during storage, handling, and installation to prevent damage.

1.08 WARRANTY

A. Manufacturer Standard Warranty:

1. Provide manufacturer standard wind speed warranty covering minimum 3 second gust wind speeds up to 215 mph.
    a. Warranty Term: Minimum 20-years after date of Substantial Completion.

B. Installer Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
    a. Structural failures including rupturing, cracking, or puncturing.
    b. Deterioration of metals and other materials beyond normal weathering.
2. Warranty Period: Straight term non-prorated, 2 years from Date of Substantial Completion.

C. Manufacturer Exposed Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal coping that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
    a. Color fading more than 5 Delta E units when tested according to ASTM D2244.
    b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
    c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Finish Warranty Period: 30 years from Date of Substantial Completion.

D. Roof System Manufacturer Metal Coping Warranty:

1. Copings shall be included in the primary roof system warranty and include all warranty requirements listed in this Section.
2. Refer to the warranty requirements of the primary roof system for additional warranty requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: Pre-engineered, pre-manufactured metal roof edge systems by Metal-Era, Inc. www.metalera.com.

B. Acceptable Manufacturers: Subject to compliance with requirements.
1. OMG/Hickman Metal Company; www.wph.com.
2. Metal Era, Inc.; www.metalera.com.
3. Petersen Aluminum Company, PAC-CLAD. www.pac-clad.com
4. Roof System Manufacturer: Edge metal system provided by the roof membrane manufacturer, meeting the requirements of this specification.

C. Contractor shop formed metal copings not acceptable.

2.02 PERFORMANCE REQUIREMENTS

A. General: Provide coping system designed to resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

B. Material Compatibility: Provide materials that are compatible with one another under conditions of service and application required.

C. Wind Resistance:
1. FMG Listing: Provide a complete system including roofing membrane, base flashings, and component materials that comply with requirements in FMG 4450 and FMG 4470 as part of a roofing system and that are listed in FMG's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FMG markings.
a. Fire/Windstorm Classification: Meeting the requirements of roof system cladding design wind uplift resistance requirements listed on Project structural drawings.
b. Edge metal shall be minimum FM 1-120 tested and approved.

D. Agency Approvals:
1. System and components shall comply with applicable Building Code requirements including ANSI-SPRI/ES-1.

2.03 MANUFACTURED COPINGS

A. Coping - Basis of Design: Metal-Era “Perma-Tite Gold” coping.

1. Version: Tapered, unless indicated otherwise on Drawings.
2. Tested: ANSI/SPRI/FM 4435/ES-1 to design pressure as noted on structural drawings for exterior cladding systems.
3. Cover Material: Minimum 0.040-inch (1.01-mm) aluminum.
    a. Provide minimum thickness required for project wind uplift rating.
4. Cover Material: .063" aluminum.
5. Cover Formed Lengths: 12’-0” (3.65 m).
6. Concealed Splice Plates: 8 inches (203 mm) wide; with factory-applied, dual, non-curing, isocryl butyl sealant strips at each joint. Provide with integral gutter to direct water out of joint. Depth to match depth of wall with additional space for movement per manufacturer requirements.
7. Anchor Clips: Galvanized steel, 12 inches (305 mm) wide.
8. Inside Face: As indicated on the Drawings.
9. Outside Face: As indicated on the Drawings.

2.04 FINISHES

A. General:
1. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Pre-Finished, Factory-Painted Finish:
1. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic, PVDF, or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).
2. Exposed Surfaces: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF FSF-free resin, and having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch (0.030 mm).
    a. Coats: Minimum two coat finish. Refer to specified finish warranty requirements.
    b. Finish Type: Arkema Group - Kynar 500 or Solvay Solexis - Hylar 5000 resin.
    c. Color: As selected by Architect from manufacturer full range.

2.05 ACCESSORIES

A. Factory-Fabricated Accessories: Provide factory welded and painted miters and jointing.
1. Miters:
    a. Outside Miters
    b. Inside Miters
    c. Transition miters.
    d. Straight transition miters.

e. T-miters.
f. Z-miters.
g. Step-up miters.

2. Endcaps:
   a. Right endcaps.
   b. Left endcaps.
3. Endwall Flashings, Coping Version:
   a. Right endwall flashings.
   b. Left endwall flashings.
4. Endwall Flashings, Splice-Plate Version:
   a. Right endwall flashings.
   b. Left endwall flashings.

B. Provide fasteners consistent with manufacturer's instructions for each product that is suitable for the substrate to which it is being installed, and in accordance with required wind uplift performance requirements.

C. Self-Adhering, High-Temperature Underlayment: Self-adhering, cold-applied, sheet underlayment, a minimum of 30 mils thick, consisting of slip-resistant, polyethylene-film top surface laminated to a layer of butyl or SBS-modified asphalt adhesive, with release-paper backing. Provide primer when recommended by underlayment manufacturer.
   1. For use where indicated in edge metal configurations.
   2. For use as a separator between dissimilar metals.
   3. Thermal Stability: Stable after testing at 240 deg F; ASTM D1970.
   4. Low-Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D1970.
   5. Acceptable products; subject to compliance with specified requirements:
      a. Carlisle Coatings and Waterproofing, Inc., WIP 300HT.
      b. GCP Applied Technologies, Grace Ice & Water Shield HT (High-Temperature).
      c. Polyguard Products, Inc., Polyguard Deck Guard HT.

D. Joint Sealants: Refer to Section 07 9200 - Joint Sealants.

E. Bituminous Paint/Coating: Refer to Section 07 1115 - Protective Bituminous Paint Coating.
   1. Coordinate with requirements of product/material manufacturer(s) of this Section.
   2. For use as corrosion protection between dissimilar materials.
   3. Apply in two coats for full coverage minimum 30 dry mil thickness, unless indicated otherwise.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine areas to receive materials.

B. Verify surfaces to support materials are clean, dry, straight, secure, and of proper dimensions.

C. Notify Architect of conditions that would adversely affect installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 INSTALLATION

A. Install materials in accordance with manufacturer's instructions at locations indicated on the Drawings.

B. Install self adhered SBS underlayment beneath all new coping, horizontal and vertical.

1. Extend down both faces of parapet min 4 inches or distance required to extend beyond bottom edge of nailer assembly by minimum 1 inch.
2. Do not extend underlayment beyond bottom edge of coping faces. No underlayment shall be visible from below.
3. Fasten self adhered flashing along both faces at minimum 6 inches on-center with fasteners at 3/4 inch from bottom edge of nailer.
4. Use ring shank nails with round heads of metal compatible with nailer, edge metal, and other adjacent materials.

C. Remove protective film immediately before installation.

D. Install materials to provide watertight termination at leading edge of roofing material.

E. Install materials to allow for thermal movement.

F. Joint Sealants: Apply joint sealants in accordance with manufacturer's instructions.

3.03 ADJUSTING

A. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.

B. Remove and replace with new material, damaged components that cannot be successfully repaired, as determined by Architect.

3.04 CLEANING

A. Clean materials promptly after installation in accordance with manufacturer's instructions.

B. Do not use harsh cleaning materials or methods that could damage finish.

3.05 PROTECTION

A. Protect installed materials to ensure that, except for normal weathering, materials shall be without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 07 7119

MANUFACTURED GRAVEL STOPS AND FASCIA

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01-48 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Factory fabricated and finished edge metal systems. This section only applies to non-coping roof edge conditions identified on the drawings as "gravel stop", "drip edge", and "fascia".

1. For other miscellaneous roof edge metal and sheet metal fabrications, refer to Section 07 6200 - Sheet Metal Flashing and Trim and project diagrams

1.03 REFERENCES

A. Definitions:

1. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.
2. Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," before multiplication by a safety factor.
3. Factored Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," after multiplication by a safety factor.

B. Reference Standards:

1. Factory Mutual (FM).
2. American National Standards Institute (ANSI)/Single Ply Roofing Industry (SPRI): ANSI/SPRI/FM 4435/ES-1 - Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

B. Attendees shall include contractor, system installer, manufacturer technical representative, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Submit manufacturer's product data, including installation instructions.

C. Shop Drawings: Submit manufacturer's shop drawings, including plans, elevations, sections, and details, indicating dimensions, materials, components, fasteners, finish, and accessories.

D. Samples: Submit manufacturer's sample of materials.

1. Sample Length: Minimum 5-1/2 inches.

E. Color Samples: Submit manufacturer's color samples of materials, consisting of complete color chart representing manufacturer's full range of available colors.

1. Submit metal chips of specific colors as requested by the Architect.

F. Sample Warranty:

1. Sample manufacturer warranty meeting the specified warranty requirements for this project.
2. Where edge metal is included in roof system warranty provide sample copy of roof system warranty indicating coverage.

G. Florida Product Approval: Provide certification of compliance with Florida product approval as indicated in section 01 6000 and as required by applicable Florida Building Code.

1.06 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements.

C. Maintenance Data: Provide manufacturer parts lists, operation, and maintenance instructions for the materials of this Section.

1.07 QUALITY ASSURANCE

A. Florida Product Approval: Exterior products and systems shall comply with Florida Building Code as indicated in Section 01 6000 including Florida Product Approval requirements.

B. Fascia/gravel stop shall be Certified in writing by the manufacturer to meet performance design criteria according to the specified performance requirements.

C. Manufacturer's Qualifications: Manufacturer regularly engaged in the manufacturing of materials of similar type to that specified for a minimum of 10 years.

D. Installer's Qualifications:

1. Installer regularly engaged in installation of materials of similar type to that specified for a minimum of 5 years.
2. Use persons trained for installation of materials of similar type to that specified following manufacturer's installation instructions.

E. Testing: Meet specified testing requirements.

1.08 PRODUCT HANDLING

A. All materials shall arrive in the manufacturer's original sealed, labeled containers.

B. Store materials in a dry, protected, well-vented area. The contractor shall report damaged material immediately to the delivering carrier and note such damage on the carrier's freight bill of lading.

C. Remove protective plastic surface film after installation.

1.09 JOB CONDITIONS

A. Verify that other trades are complete before installing the edge metal system.

B. Mounting surfaces shall be straight and secure; substrates shall be of proper width.

C. Coordinate installation with roof system manufacturer installation instructions.

1.10 WARRANTY

A. Manufacturer Standard Warranty:
1. Provide manufacturer standard wind speed warranty covering minimum 3 second gust wind speeds up to 215 mph.
a. Warranty Term: Minimum 20-years after date of Substantial Completion.

B. Installer Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
a. Structural failures including rupturing, cracking, or puncturing.
b. Deterioration of metals and other materials beyond normal weathering.
2. Warranty Period: Straight term non-prorated, 2 years from Date of Substantial Completion.

C. Manufacturer Exposed Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal coping that shows evidence of deterioration of factory-applied finishes within specified warranty period.
1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
a. Color fading more than 5 Delta E units when tested according to ASTM D2244.

b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.

c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 30 years from Date of Substantial Completion.

D. Roof System Manufacturer Metal Coping Warranty:

1. Copings shall be included in the primary roof system warranty and include all warranty requirements listed in this Section.

2. Refer to the warranty requirements of the primary roof system for additional warranty requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Pre-engineered, pre-manufactured metal roof edge systems by one of the following acceptable manufacturers:

B. Acceptable Manufacturers: Subject to compliance with requirements.

1. OMG/Hickman Metal Company; www.wph.com.

2. Metal Era, Inc.; www.metalera.com.

3. Petersen Aluminum Company, PAC-CLAD. www.pac-clad.com

4. Roof System Manufacturer: Edge metal system provided by the roof membrane manufacturer, meeting the requirements of this specification.

C. Contractor shop formed metal copings not acceptable.

2.02 PERFORMANCE REQUIREMENTS

A. General: Provide coping system designed to resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

B. Material Compatibility: Provide materials that are compatible with one another under conditions of service and application required.

C. Wind Resistance:

1. FMG Listing: Provide assembly identical to system currently tested to meet specified Factory Mutual performance level. Identify materials with FMG markings.

a. Fire/Windstorm Classification: Meeting the requirements of roof system cladding design wind uplift resistance requirements listed on Project structural drawings.

b. Edge metal shall be minimum FM 1-120 tested and approved.

D. Agency Approvals:

1. System and components shall comply with applicable Building Code requirements including ANSI-SPRI/ES-1.

2.03 MANUFACTURED EDGE METAL, GRAVEL STOP FASCIA SYSTEM AT LOW SLOPE ASPHALT BASED ROOFS

A. Basis of Design: Metal Era Anchor-Tite Fascia.

B. Assembly designed for low slope asphalt and modified bitumen roofs; consisting of exterior fascia and continuous compression anchor bar.

1. Designed for use at non-gutter locations and continuous gutter locations.
    a. At continuous gutter locations provide continuous drainage design with no water dams.
2. Exterior Fascia Covers:
    a. Material: 0.040” aluminum, minimum.
3. Approvals:
    a. ANSI/SPRI/FM 4435/ES-1 up to 275 psf Horizontal.
    b. FM Approved up to 1-270 Perimeter and 1-225 Corner.
    c. Miami-Dade County Approved.
    d. Florida Product Approval.
4. Extruded Anchor Bar:
    a. Material: Aluminum
    b. Thickness: Varies based on face height.
    c. Extruded Lengths: 12’-0”.
    d. Fastener Holes: Pre-Punched.
5. Anchor Bar Splices:
    a. Material: EPDM Rubber.
6. Lap Joints
    a. Material: Same as exterior fascia covers.
    b. Finish and Color: Same as exterior fascia covers.
    c. Width: 1”.
7. Outside Face: Height as indicated on the Drawings. Provide integral drip edge at bottom.
8. Concealed splice plates.
9. Formed Lengths: 12 feet (3.65 m).
10. Slotted Fastening Holes: 12 inches (305 mm) and 6 inches (152 mm) on center.
11. Waterdam: 24-gauge (0.65-mm) galvanized steel.
12. Stainless steel 1-1/2” ring shank roofing nail as provided by manufacturer.

2.04 FINISHES

A. General:

1. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Pre-Finished, Factory-Painted Finish:

1. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic, PVDF, or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).
2. Exposed Surfaces: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF FSF-free resin, and having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch (0.030 mm).
    a. Coats: Minimum two coat finish. Refer to specified finish warranty requirements.
    b. Finish Type: Arkema Group - Kynar 500 or Solvay Solexis - Hylar 5000 resin.
3. Color: As selected by Architect from manufacturer full range.

2.05 ACCESSORIES

A. All components shall be factory fabricated, factory welded, factory painted, with mitered corners.

B. Components and accessories include, but are not limited to corners, end caps, fascia sumps, spillouts, etc. shall be fabricated by the edge metal manufacturer.

C. Provide fasteners consistent with manufacturer's instructions for each product that is suitable for the substrate to which it is being installed, and in accordance with required wind uplift performance requirements.

D. Joint Sealants: Refer to Section 07 9200 - Joint Sealants.

E. Self-Adhering, High-Temperature Underlayment: Self-adhering, cold-applied, sheet underlayment, a minimum of 30 mils thick, consisting of slip-resistant, polyethylene-film top surface laminated to a layer of butyl or SBS-modified asphalt adhesive, with release-paper backing. Provide primer when recommended by underlayment manufacturer.

1. For use beneath all metal copings.
2. For use as a separator between dissimilar metals.
3. Thermal Stability: Stable after testing at 240 deg F; ASTM D1970.
4. Low-Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D1970.
5. Acceptable products; subject to compliance with specified requirements:
    a. Carlisle Coatings and Waterproofing, Inc., WIP 300HT.
    b. GCP Applied Technologies, Grace Ice & Water Shield HT (High-Temperature).

c. Polyguard Products, Inc., Polyguard Deck Guard HT.

F. Bituminous Paint/Coating: Refer to Section 07 1115 - Protective Bituminous Paint Coating.

1. Coordinate with requirements of product/material manufacturer(s) of this Section.
2. For use as corrosion protection between dissimilar materials.
3. Apply in two coats for full coverage minimum 30 dry mil thickness, unless indicated otherwise.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Verify that the edge metal installation will not disrupt other trades or construction processes.

C. Verify that the substrate is dry, clean and free of foreign matter. Report and correct defects prior to any product installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Verify the manufacturer's roof edge details for accuracy to fit the assembly prior to fabrication.

3.03 INSTALLATION OF EDGE METAL SYSTEM

A. Install in accordance with manufacturer's installation instructions.

B. Installing contractor shall check as-built conditions and verify the manufacturers edge metal details for accuracy to fit the wall assembly prior to fabrication. The installer shall comply with the edge metal manufacturer’s installation guide when installing the edge metal.

C. Utilize fasteners consistent with manufacturer's instructions for each product that is suitable for the substrate to which it is being installed, and in accordance with required wind uplift performance requirements.

1. Fasteners must be compatible with substrates to avoid fastener corrosion.
2. Utilize stainless steel fasteners as provided by manufacturer, minimum 1-1/2 inch depth, suitable for the substrates to which being installed.

D. Thermal Expansion: Create gap between retainer sections and between fascia sections in accordance with manufacturer's instructions to allow for thermal expansion.

E. Fasteners:

1. Install fascia system using concealed fasteners in accordance with manufacturer's instructions.
2. Do not penetrate Horizontal roofing surface with fasteners.

F. Isolate fascia system from ACQ treated wood blocking or other galvanically incompatible material with appropriate corrosion protection material.

G. Install water cut-off sealant within assembly, as recommended by the membrane manufacturer.

3.04 CLEANING

A. Clean fascia system promptly after installation in accordance with manufacturer's instructions.

B. Remove clear protective vinyl film.

C. Do not use harsh cleaning materials or methods that could damage finish.

3.05 PROTECTION

A. Protect installed products until date of Substantial Completion of project.

END OF SECTION

SECTION 07 7200

ROOF ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Roof equipment curbs.

B. Roof expansion joint curbs.

C. Equipment rails.

D. HVAC condensing unit stands.

E. Roof hatches.

1.02 PERFORMANCE REQUIREMENTS, GENERAL

A. General Performance: Roof accessories shall withstand exposure to weather and resist wind and thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

B. Roof accessories shall comply with applicable code requirements include wind uplift resistance, structural design, and applicable OSHA requirements. Refer to project structural drawings for exterior cladding wind resistance requirements.

1.03 COORDINATION

A. Coordinate layout and installation of roof accessories with roof system heights and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.

B. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported. Ensure height of curb above finished roof surface meets specified requirements.

C. Coordinate curb supports with project roof system specifications and mechanical drawings and specifications.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation to discuss conformance with project requirements, manufacturer installation requirements, affected adjacent materials and system, and site conditions.

B. Attendees shall include contractor, roof accessory installer(s), and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: For each type of roof accessory.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

C. Shop Drawings: For roof hatches.

1. Indicate mounting, securing, and flashing requirements of curbs to structure, and items to curbs.

2. Indicate compliance with "Performance Requirements" article of this Section.

D. Shop Drawings: For roof curbs and rails.

1. Include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and field-assembled work.

2. Indicate mounting, securing, and flashing requirements of curbs to structure, and items to curbs.

3. Indicate compliance with "Performance Requirements" article of this Section.

E. Shop Drawings: For HVAC condensing unit stands.

1. Include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and field-assembled work.

2. Indicate mounting, securing, and flashing requirements of stands to structure, and items to stands.

3. Indicate compliance with "Performance Requirements" article of this Section.

F. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:

1. Size and location of roof accessories specified in this Section.

2. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.

3. Required clearances.

1.06 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Maintenance Data: Provide manufacturer parts lists, operation, and maintenance instructions for the materials of this Section.

1.07 QUALITY ASSURANCE

A. Delegated-Design Engineer qualifications: Engineering shall be performed by a professional engineer licensed in the State of Louisiana and experienced in providing engineering services of the kind indicated that have resulted in successful installation of items of similar material, design and extent to that indicated for this Project.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store products under cover and elevated above grade.

1.09 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.

1. Warranty Period: One year from date of Substantial Completion.

B. Special Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, where items fail to perform as designed and manufactured.

1. Warranty Period: Provide manufacturer standard warranty.

C. Special Manufacturer Warranty on Roof Hatches and Accessories: Manufacturer warranty in which manufacturer agrees to repair or replace roof accessories that fail to perform as a result of manufacturing defects specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 ROOF CURBS FOR ROOFTOP EQUIPMENT

A. Curb Heights: Minimum curb height above finished roof surface shall be 12 inches in all locations. Coordinate with roof system slopes to maintain required heights.

B. Acceptable Manufacturers: Subject to compliance with requirements.

1. AES Industries Inc: www.aescurb.com
2. The Pate Company: www.patecurbs.com
3. LMCurbs: www.lmcurbs.com
4. MKT Metal Manufacturing: www.mktduct.com
5. Roof Products & Systems (RPS): www.rpscurbs.com

C. Prefabricated Curbs:

1. Type: Minimum 18 ga. hot dip galvanized steel construction with factory-installed, preservative-treated wood nailers and integral counterflashing. Fully welded corners and seams. Fully watertight construction.
2. Insulation: Manufacturer standard insulation meeting required R-Value and UL Class A fire rating.
3. Minimum R-Value: R25.
4. Curb Height: As specified in this Section, typical for all curbs.

D. Prefabricated Curb Caps:

1. Minimum 18 ga. hot dip galvanized steel and 3/4-inch pressure treated, fire rated, plywood construction.
2. Proved minimum 4 inch vertical flange over exterior face of curb assembly with clearance for two piece roof system base flashing assembly.
3. Fully welded corners and seams. Fully watertight and airtight construction.
4. Insulated on interior bottom side to match curb R-value.
5. Continuous minimum 1 inch butyl sealant tape for air and water seal between top horizontal curb surface and bottom of cap.
6. Sloped top for positive water drainage.
7. Secure top with gasketed, high dome, stainless steel fasteners at 6 inches on-center, minimum 4 per side. Install to resist applicable code wind uplift resistance requirements.
8. Complying with applicable codes and regulations including applicable OSHA requirements.
9. Basis of Design: As provided by curb manufacturer or custom sheet metal fabrication in accordance with requirements indicated.

E. Equipment Supports and Rails:

1. Type: Minimum 18 ga. hot dip galvanized steel construction with factory-installed, preservative-treated wood nailers and integral counterflashing.

2.02 ROOF HATCHES

A. Acceptable Manufacturers: Subject to compliance with requirements.

1. Basis of Design: Bilco Company: www.bilco.com
2. Babcock-Davis: www.babcockdavis.com
3. Nystrom: www.nystrom.com

B. Thermally Broken, Insulated, Roof Hatch: Factory-assembled aluminum frame and cover, complete with operating and release hardware.

1. Basis of Design: Bilco Type E-50TB - 36 by 36 inches. Single-leaf style unless indicated as double-leaf.
    a. Designed for use with wall mounted hatch access ladders.

2. Style: Provide flat metal covers unless otherwise indicated.
3. Material: Cover and frame are 11 gauge (2.3 mm) aluminum.
4. Mounting Substrate: Provide frames and curbs suitable for mounting on flat roof deck with adjacent roof system.
5. Cover: Brake formed, hollow-metal design with 3 inches (75 mm) concealed polyisocyanurate insulation (R Value of 20+), 5 inches (100 mm) beaded, overlapping flange, fully welded at corners, and internally reinforced for 40 psf (195kg/m2) live load.
6. Curb: 12 inches (305 mm) in height with integral cap flashing, 3 inches (75 mm) polyisocyanurate insulation (R Value of 20+), fully welded at corners, and 5-1/2 inches (114 mm) mounting flange with 7/16 inches holes (11 mm) provided for securing frame to the roof deck.
7. Gasket: Continuous extruded EPDM rubber gasket permanently adhered to cover.
8. Hinges: Heavy-duty pintle hinges with 3/8 inches (9 mm) Type 316 stainless steel hinge pins.
9. Latch: Slam latch with interior and exterior turn handles and padlock hasps on interior side.
10. Lift Assistance: Compression spring operators enclosed in telescopic tubes. Automatic hold-open arm with grip handle release.
11. Finish: Mill finish aluminum.
12. Hardware: Engineered composite compression spring tubes and steel compression springs packed in grease. Type 316 stainless steel hinges. All other hardware shall be zinc plated/chromate sealed.

2.03 ROOFTOP HVAC CONDENSING UNIT STAND

A. Provide prefabricated and pre-engineered condensing unit stand designed to support project HVAC condensing units and withstand applicable project wind load resistance requirements.
   1. Characteristics:
      a. Specifically prefabricated and designed for support of rooftop HVAC condensing units.
      b. Composed of internally webbed aluminum tubing with aluminum I-shaped support beams, cross mounting angles for additional unit supports, electrical box mounting brackets, and anti-vibration pads.
      c. Material: 6061-T6 Aluminum.
   2. Wind Resistance: Tested to withstand wind load design pressures indicated on project structural engineering drawings.
   3. Accessories:
      a. Aluminum cross mounting angle designed for use in extending the width of the stand as needed for wind uplift resistance ratings and support of condensing units.

b. Electrical mounting bracket for use in mounting electrical boxes directly to the stand in a hanging or standing position.

B. Basis of Design: Model AST or Model AS14 by Miami Tech, Inc. www.miamitech.com

1. Coordinate model and size of stand with project HVAC equipment requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using methods recommended by manufacturer for achieving acceptable results for applicable substrate under project conditions.

3.03 INSTALLATION

A. Install in accordance with fabricator or manufacturer's instructions.

B. Set items plumb, level, and true to line. Align parallel to roof perimeters and as shown on Architect drawings.

3.04 CLEANING

A. Clean installed work to like-new condition. Replace items that cannot be cleaned to like-new condition.

3.05 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before date of Substantial Completion.

END OF SECTION

SECTION 07 8400

FIRESTOPPING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Firestopping systems.

B. Firestopping of all joints and penetrations in fire resistance rated and smoke resistant assemblies, whether indicated on Drawings or not, and other openings indicated.

1.03 REFERENCE STANDARDS

A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems.

C. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems.

D. ASTM E2174 - Standard Practice for On-Site Inspection of Installed Firestops.

E. ASTM E2393 - Standard Practice for On-Site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers.

F. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies.

G. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

H. ITS (DIR) - Directory of Listed Products.

I. FM 4991 - Approval Standard for Firestop Contractors.

J. FM (AG) - FM Approval Guide.

K. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems.

L. UL (DIR) - Online Certifications Directory..

M. UL (FRD) - Fire Resistance Directory.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation to discuss conformance with project requirements, manufacturer installation requirements, affected adjacent materials and system, and site conditions.

B. Attendees shall include contractor, firestopping installer(s), and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Provide data on product characteristics, performance ratings, and limitations.

C. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.

D. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.

E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

F. Installer Qualification: Submit qualification statements for installing mechanics.

1.06 QUALITY ASSURANCE

A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.

1. Listing in UL (FRD), FM (AG), or ITS (DIR) will be considered as constituting an acceptable test report.

2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at www.icc-es.org will be considered as constituting an acceptable test report.

3. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum five years documented experience.

C. Installer Qualifications: Company specializing in performing the work of this Section and as follows.

1. Approved by Factory Mutual Research Corporation under FM 4991, or meeting any two of the following requirements:

a. Verification of minimum three years documented experience installing work of this type.

b. Verification of at least five satisfactorily completed projects of comparable size and type.

c. Licensed by local code officials (AHJ).

D. Single source responsibility: Obtain firestop systems for each kind of penetration and construction condition indicated from a single primary firestop systems manufacturer.

1. Materials from different manufacturer than allowed by tested and listed system shall not be intermixed in the same firestop system or opening.

2. Install tested and listed firestop systems before installing an Engineering Judgement or Equivalent Fire Resistance Rated Assembly (EFFRA).

1.07 FIELD CONDITIONS

A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.

B. Provide ventilation in areas where solvent-cured materials are being installed.

1.08 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.

1. Warranty Period: One year from date of Substantial Completion.

B. Special Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, where items fail to perform as designed and manufactured.

1. Warranty Period: Provide manufacturer standard warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with requirements.

1. 3M Fire Protection Products. www.3m.com/firestop.

2. Everkem Diversified Products, Inc; Intumescent Fire-Rated Putty Pads. www.everkemproducts.com.

3. Hilti, Inc. www.us.hilti.com.

4. Nelson FireStop Products. www.nelsonfirestop.com.

5. Specified Technologies, Inc. (STI).

6. Tremco Commercial Sealants & Waterproofing. www.tremcosealants.com.

2.02 MATERIALS

A. Volatile Organic Compound (VOC) Content: Provide products having VOC content lower than that required by SCAQMD 1168.

B. Mold and Mildew Resistance: Provide firestopping materials with mold and mildew resistance rating of zero(0) in accordance with ASTM G21.

C. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.

D. Intumescent Putty:

1. General - Fire-Rated Intumescent Putty Pads: Designed to seal around electrical boxes to maintain the hourly integrity of fire rated walls restricting the passage of flame, smoke, and toxic gases. UL Classified for 1 and 2 hour fire rated wall systems.
2. Characteristics:
    a. ASTM E90.
    b. UL classified.
    c. Non-curing, repositionable.
    d. Red color.
    e. No asbestos fillers.

2.03 FIRESTOPPING ASSEMBLY REQUIREMENTS

A. Refer to Drawings for firestopping assembly configurations.

B. Head-of-Wall Joint System Firestopping at Joints Between Fire-Rated Wall Assemblies and Non-Rated Horizontal Assemblies: Use system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of floor or wall, whichever is greater.

1. Movement: Provide systems that have been tested to show movement capability as indicated.

C. Floor-to-Floor, Wall-to-Wall, and Wall-to-Floor Joints, Except Perimeter, Where Both Are Fire-Rated: Use system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.

1. Movement: Provide systems that have been tested to show movement capability as indicated.
2. Air Leakage: Provide systems that have been tested to show L Rating as indicated.
3. Watertightness: Provide systems that have been tested to show W Rating as indicated.
4. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.

D. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.

1. Temperature Rise: Provide systems that have been tested to show T Rating as indicated.
2. Air Leakage: Provide systems that have been tested to show L Rating as indicated.
3. Watertightness: Provide systems that have been tested to show W Rating as indicated.
4. Listing by FM (AG), ITS (DIR), UL (DIR), or UL (FRD) in their certification directories will be considered evidence of successful testing.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify openings are ready to receive the work of this Section.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.

B. Remove incompatible materials that could adversely affect bond.

C. Install backing materials to prevent liquid material from leakage.

3.03 INSTALLATION

A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.

B. Do not cover installed firestopping until inspected by code officials.

C. Install labeling required by code.

3.04 FIELD QUALITY CONTROL

A. Independent Testing Agency: Contractor shall engage a testing agency to examine penetration firestopping in accordance with ASTM E2174, and ASTM E2393.

B. Repair or replace penetration firestopping and joints at locations where inspection results indicate firestopping or joints do not meet specified requirements.

3.05 CLEANING

A. Clean adjacent surfaces of firestopping materials.

3.06 PROTECTION

A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 07 9200

JOINT SEALANTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Nonsag gunnable joint sealants.

B. Joint backings and accessories.

1.03 REFERENCES

A. Definitions:

1. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
2. Self-Leveling Sealants: Pourable or self-leveling sealant that has sufficient flow to form a smooth, level surface when applied in a horizontal joint.
3. Sound-Rated Assemblies: Walls and ceilings identified as "STC-rated", "sound-rated", or "acoustical". Coordinated with the requirements of specified gypsum board assemblies.

B. Reference Standards:

1. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer.
2. ASTM C794 - Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants.
3. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
4. ASTM C1193 - Standard Guide for Use of Joint Sealants.
5. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants.
6. ASTM C1311 - Standard Specification for Solvent Release Sealants.
7. ASTM C1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints.
8. SWRI (VAL) - SWR Institute Validated Products Directory; Current Edition.

1.04 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used.

1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
2. List of backing materials approved for use with the specific product.
3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
4. Substrates the product should not be used on.
5. Substrates for which use of primer is required.
6. Substrates for which laboratory adhesion and/or compatibility testing is required.
7. SWRI Validation: Provide currently available sealant product validations as listed by SWRI (VAL) for specified sealants.

C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.

D. Color Charts for Selection: Where sealant color is not specified, submit manufacturer's color charts showing standard colors available for selection.

E. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.

F. Installation Log: Submit filled out log for each length or instance of sealant installed.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum three years documented experience.

B. Installer Qualifications: Company specializing in performing the work of this Section and with at least three years of documented experience.

C. Preconstruction Laboratory Testing: Sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.

1. Adhesion Testing: In accordance with ASTM C794.
2. Compatibility Testing: In accordance with ASTM C1087.
3. Stain Testing: In accordance with ASTM C1248; required only for porous substrates.
4. Allow sufficient time for testing to avoid delaying the work.
5. Deliver to manufacturer sufficient samples for testing.
6. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.
7. Testing is not required if sealant manufacturer provides data showing previous testing, not older than 24 months, that shows satisfactory adhesion, lack of staining, and compatibility.

D. Installation Plan: Include schedule of sealed joints, including the following.
   1. Joint width indicated in contract documents.
   2. Joint depth indicated in contract documents; to face of backing material at centerline of joint.
   3. Method to be used to protect adjacent surfaces from sealant droppings and smears, with acknowledgement that some surfaces cannot be cleaned to like-new condition and therefore prevention is imperative.
   4. Approximate date of installation, for evaluation of thermal movement influence.

E. Field Adhesion Test Procedures:
   1. Allow sealants to fully cure as recommended by manufacturer before testing.
   2. Have a copy of the test method document available during tests.
   3. Take photographs or make video records of each test, with joint identification provided in the photos/videos; for example, provide small erasable whiteboard positioned next to joint.
   4. Record the type of failure that occurred, other information required by test method, and the information required on the Field Quality Control Log.
   5. When performing destructive tests, also inspect the opened joint for proper installation characteristics recommended by manufacturer, and report any deficiencies.
   6. Deliver the samples removed during destructive tests in separate sealed plastic bags, identified with project, location, test date, and test results, to Owner.
   7. If any combination of sealant type and substrate does not show evidence of minimum adhesion or shows cohesion failure before minimum adhesion, report results to Architect.

F. Field Adhesion Tests of Joints: Test for adhesion using most appropriate method in accordance with ASTM C1521, or other applicable method as recommended by manufacturer.

G. Stain Test Characteristics: Where sealants are required to be nonstaining, provide sealants tested per ASTM C1248 as non-staining on porous joint substrates specified.

1.06 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:
   1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
   2. When joint substrates are wet.
   3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
   4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.07 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Exterior Silicone Sealant Warranty Period: 20 years from date of Substantial Completion.

a. Coverage: Sealants shall be free from defects in materials and not fail to provide structural adhesion, watertight weatherseal, and shall not stain substrates applied over.

2. Other Sealants Warranty Period: Five years from date of Substantial Completion.

C. Special warranties listed may exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.

2. Disintegration of joint substrates from causes exceeding design specifications.

3. Mechanical damage caused by individuals, tools, or other outside agents.

4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 PRODUCTS

2.01 JOINT SEALANT APPLICATIONS

A. Scope:

1. Coordinate with sealant requirements listed in other sections for specific assemblies where manufacturer recommendations are indicated.

2. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.

a. Wall expansion and control joints.

b. Joints between door, window, and other frames and adjacent construction.

c. Joints between different exposed materials.

d. Openings below ledge angles in masonry.

e. Other joints indicated below.

3. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
   a. Joints between door, window, and other frames and adjacent construction.
   b. Other joints indicated below.
4. Interior Wet Areas: Bathrooms, restrooms, kitchens, food service areas, and food processing areas; fixtures in wet areas include plumbing fixtures, food service equipment, countertops, cabinets, and other similar items.

B. Do not seal the following types of joints:
1. Intentional weepholes.
2. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
3. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
4. Joints where installation of sealant is specified in another section.
5. Joints between suspended panel ceilings/grid and walls.

2.02 JOINT SEALANTS - GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. Sealants and Primers: Provide products having lower volatile organic compound (VOC) content than indicated in SCAQMD 1168.

2.03 EXTERIOR JOINT SEALANTS

A. Locations for sealants are provided in Part 3, "Exterior Joint Sealant Schedule" of this Section.
1. For sealant in direct contact with roofing or exterior waterproofing systems, refer to system specific specification sections.

B. Type EXT-JS-1 - Exterior Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus 100 percent, minus 50 percent, minimum.
2. Color: To be selected by Architect from manufacturer's standard range.
3. Cure Type: Single-component, neutral moisture curing.
4. Service Temperature Range: Minus 65 to 180 degrees F (Minus 54 to 82 degrees C).
5. Primer: Provide primer by sealant manufacturer as recommended for project substrates.
6. Manufacturers:

a. Dow Chemical Company; DOWSIL 790 Silicone Building Sealant. consumer.dow.com/en-us/industry/ind-building-construction.html
b. Sika Corporation; Sikasil WS-290. www.usa-sika.com
c. Tremco Commercial Sealants & Waterproofing; Spectrem 1. www.tremcosealants.com
d. Pecora 890 NST. www.pecora.com

C. Type EXT-JS-2 - Exterior Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
1. Movement Capability: Plus and minus 50 percent, minimum.
2. Color: To be selected by Architect from manufacturer's standard range.
3. Cure Type: Single-component, neutral moisture curing.
4. Service Temperature Range: Minus 65 to 180 degrees F (Minus 54 to 82 degrees C).
5. Primer: Provide primer by sealant manufacturer as recommended for project substrates.
6. Manufacturers:
a. Dow Chemical Company; DOWSIL 795 Silicone Building Sealant. consumer.dow.com/en-us/industry/ind-building-construction.html
b. Sika Corporation; Sikasil WS-295. www.usa-sika.com
c. Tremco Commercial Sealants & Waterproofing; Spectrem 2. www.tremcosealants.com
d. Pecora 895 NST. www.pecora.com

D. Type EXT-JS-3 - Hybrid STPE/STPU Sealant: High-performance, low-modulus, high movement, non-sag, fast curing, ready-to-use hybrid sealant.
1. ASTM C 920, Type S, Grade NS, Class 50, Use T and NT, M, A, and O.
2. Movement Capability: Plus and minus 50 percent, minimum.
3. Acceptable for use with aluminum, vinyl, wood, PVDF coatings, EIFS, cement plaster (stucco), concrete, masonry, natural stone, poly-ash and fiber cement panel systems, and vinyl.
4. Tintable and field paintable.
5. Color: To be selected by Architect from manufacturer's full range.
6. Basis of Design: Sikaflex HY 100.

E. Type EXT-JS-4 - Butyl Sealant: Solvent-based; ASTM C1311; single component, nonsag; not expected to withstand continuous water immersion or traffic.
1. Not for exposed or paintable applications.
2. Color: To be selected by Architect from manufacturer's standard range.
3. Manufacturers:

a. Sherwin-Williams Company. Storm Blaster All Season Sealant. www.sherwin-williams.com
b. White Lightning, Inc. Storm Blaster All Season Sealant. www.wlcaulk.com
c. Tremco Butyl Sealant by Tremco, Inc. www.tremcosealants.com
d. Pecora BC-158. www.pecora.com

2.04 INTERIOR JOINT SEALANTS

A. Locations for sealants are provided in Part 3, "Interior Joint Sealant Schedule" of this Section.

B. Type INT-JS-1 - Acrylic Emulsion Latex: ASTM C 834, water-based; 1, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.
1. Movement Capability: Meeting the minimum requirements of ASTM C 834.
2. Color: To be selected by Architect from manufacturer's standard range.
3. Grade: 1, Grade - Minus 18 Degrees C.
4. For paintable interior sealant applications.
5. Basis of Design: Tremco Commercial Sealants & Waterproofing; Tremflex 834. www.tremcosealants.com.
6. Manufacturers:
a. Pecora Corporation; Pecora AC-20 +Silicone. www.pecora.com.
b. Sherwin-Williams Company; White Lightning 3006 Siliconized Acrylic Latex Caulk. www.sherwin-williams.com
c. Top Gun, a brand of PPG Architectural Coatings; Top Gun 200. www.ppgpaints.com
d. Tremco Commercial Sealants & Waterproofing; Tremflex 834. www.tremcosealants.com.

C. Type INT-JS-2 - Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant, moisture resistant; not expected to withstand continuous water immersion or traffic.
1. Color: As selected by Architect from manufacturer full range.
2. For non-painted sealant applications.
3. Basis of Design: Masterseal Omniplus.
4. Acceptable Products: Subject to compliance with requirements.
a. Masterseal Omniplus.
b. Pecora Corporation; 898NST Silicone Sanitary Sealant. www.pecora.com.
c. Sika Corporation; Sikasil GP. www.usa-sika.com
d. Dow Chemical Company; DOWSIL 786 Silicone Sealant. www.consumer.dow.com/en-us/industry/ind-building-construction.html.

e. Tremco Commercial Sealants & Waterproofing; Tremsil 200. www.tremcosealants.com

D. Type INT-JS-3 - Sanitary Silicone Sealant: ASTM C920, Type S, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.

1. Characteristics:
   a. When fully cured and washed, sealant shall be FDA approved and meet the requirements of FDA Regulation 21CFR177-2600 for use on countertops and other areas where it may be in contact with food.
   b. USDA approved.
2. Movement Capability: Plus and minus 25 percent, minimum.
3. Color: White or clear as selected by Architect.
4. Basis of Design: Momentive Performance Materials, Inc; GE SCS1000 Contractors: www.siliconeforbuilding.com
5. Acceptable Products: Subject to compliance with requirements.
   a. Pecora Corporation; Pecora 860. www.pecora.com.
   b. Momentive Performance Materials, Inc; GE SCS1000 Contractors. www.siliconeforbuilding.com
   c. Tremco Commercial Sealants & Waterproofing; Tremco Proglaze. www.tremcosealants.com
   d. White Lightning Products, Inc; White Lightning All Purpose Silicone Rubber. www.wlcaulk.com

E. Type INT-JS-4 - Flexible Polyurethane Foam: Single-component, gun grade, and low-expanding.

1. Characteristics:
   a. Designed for use as a thermal barrier and airtight, weather proof seal within fenestration frames, such as window or door frames, at rough openings.
   b. Product shall be a closed cell, polyurethane, minimal expanding foam which will not absorb water, warp, distort, or deflect window or door frames.
2. Movement Capability: Plus and minus 15 percent, minimum. Overall movement capability of 30 percent.
3. Color: White.
4. Manufacturers:
   a. DAP Products Inc; DRAFTSTOP 812 Foam. www.dapspecline.com.
   b. Soudal Accumetric, Inc; Soudafoam Door and Window. www.soudalusa.com
   c. Tremco Commercial Sealants & Waterproofing; ExoAir Flex Foam. www.tremcosealants.com.

2.05 TRAFFIC JOINT SEALANTS - EXTERIOR

A. For exterior site and paving sealants, refer to project civil and/or landscaping drawings and specifications.

2.06 TRAFFIC JOINT SEALANTS - INTERIOR

A. For use in parking deck core areas within architectural scope such as elevators, stairs, mechanical, electrical, and elevator service related rooms.

1. For parking deck joint sealants, refer to the requirements of parking deck scope.

B. For use in service, back of house, and/or core areas within architectural scope such as elevators, stairs, mechanical, electrical, and elevator service related rooms.

1. Coordinate with flooring finishes for compatibility. Where conflict exists, the flooring finish manufacturer requirement shall apply. Notify Architect of conflicts.

C. Type TRF-1 - Semi-Self-Leveling Polyurethane Sealant: Intended for joints in concrete such as interior floor slabs, sidewalks, swimming pool decks, plazas, and other horizontal surfaces with up to 6 percent slope.

1. Composition: Multi-component.
2. Type : Two part urethane sealant designed for traffic rated applications.
3. Durometer Hardness, Type A: 35 to 45, minimum, when tested in accordance with ASTM D2240.
4. Color: To be selected by Architect from manufacturer's standard colors.
5. Tensile Strength: 250 to 300 psi (1.72 to 2.07 MPa) in accordance with ASTM D412.
6. Acceptable Products: Subject to compliance with requirements.
    a. Tremco Commercial Sealants & Waterproofing; Vulkem 445 SSL. www.tremcosealants.com
    b. Masterseal Sonolastic NP2.

D. Acceptable Manufacturers: Subject to compliance with specified requirements.

1. Pecora Corporation. www.pecora.com.
2. Sika Corporation. www.usa-sika.com
3. Tremco Commercial Sealants & Waterproofing. www.tremcosealants.com

2.07 ACOUSTICAL JOINT SEALANTS

A. General: Provide acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies according to ASTM E90.

B. Type AC-JS-1 - Acoustical Sealant for Exposed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex acoustical sealant complying with ASTM C834.

1. Color: Colors as selected by Architect from manufacturer's full range of colors.
2. Products: Subject to compliance with requirements.
    a. Accumetric LLC; BOSS 826 Acoustical Sound Sealant. www.accumetricinc.com
    b. GE Construction Sealants; RCS20 Acoustical. www.siliconeforbuilding.com
    c. Grabber Construction Products; Acoustical Sealant GSC. www.grabberman.com
    d. Pecora Corporation; AIS-919. www.pecora.com
    e. Tremco, Incorporated; Tremco Acoustical Sealant. www.tremcosealants.com
    f. United States Gypsum Company; SHEETROCK Acoustical Sealant.

C. Type AC-JS-2 - Acoustical Sealant for Concealed Joints: Manufacturer's standard nonsag, nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber acoustical sealant.
1. Color: Colors as selected by Architect from manufacturer's full range of colors.
2. Products: Subject to compliance with requirements.
    a. Pecora Corporation. BA-98.
    b. Serious Energy Inc. Quiet Seal 350.

D. Type AC-JS-3 - Acoustical Tape: Closed cell polyvinyl chloride foam tape.
1. Size: Minimum 1/4 inch thick by 1 inch wide. Size to fit application, trim as necessary.
2. Color: Colors as selected by Architect from manufacturer's full range of colors.
3. Products: Subject to compliance with requirements.
    a. Saint-Gobain Performance Plastics, Inc. Norseal V730. www.plastics.saint-gobain.com
    b. Soundaway Corporation, Inc. Neoprene Isolation Gasket PSA. www.soundaway.com
    c. Foamtapes.net, a division of LAMATEK, Inc; Foamtapes PolyVinyl Chloride (PVC) Foam 7 lb: www.foamtapes.net

2.08 ACCESSORIES

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing. The following materials are listed as basis of design and shall be coordinated with specified requirements.

B. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
1. Provide the following as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

a. ASTM C1330, Type O (open-cell material). Not for use at exterior applications.

b. ASTM C1330, Type B (bicellular material with a surface skin). For use at exterior applications.

C. Bond-Breaker / Backing Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint.

1. Provide self-adhesive tape where applicable.

D. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.

1. For use to temporary mask adjacent surfaces during sealant system application.

E. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.

F. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

G. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Verify that backing materials are compatible with sealants.

C. Verify that backer rods are of the correct size.

D. Preinstallation Adhesion Testing: Install a sample for each test location indicated in the test plan.

1. Test each sample as specified in PART 1 under QUALITY ASSURANCE article.
2. Notify Architect of date and time that tests will be performed, at least 7 days in advance.
3. Arrange for sealant manufacturer's technical representative to be present during tests.
4. Record each test on Preinstallation Adhesion Test Log as indicated.
5. If any sample fails, review products and installation procedures, consult manufacturer, or take whatever other measures are necessary to ensure adhesion; re-test in a different location; if unable to obtain satisfactory adhesion, report to Architect.

6. After completion of tests, remove remaining sample material and prepare joint for new sealant installation.

E. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 PREPARATION

A. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

B. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include, but are not limited to, the following:
    a. Concrete.
    b. Masonry.
    c. Unglazed surfaces of tile.
    d. Natural stone, cast stone.
3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
    a. Metal.
    b. Glass.
    c. Porcelain enamel.
    d. Glazed tile; porcelain or ceramic.

C. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

D. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.03 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

1. Do not seal joints in exterior systems intended to perform drainage/weep function.

B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave tooled joint profile unless noted otherwise.
    a. Concave joint profile per Figure 8A in ASTM C1193 unless otherwise indicated.
    b. Provide flush joint profile only at locations indicated according to Figure 8B in ASTM C1193.
4. Provide recessed joint configuration at locations indicated according to Figure 8C in ASTM C1193.
5. Use masking tape to protect surfaces adjacent to recessed tooled joints.

G. Acoustical Sealants: Provide and install acoustical joint sealants at all acoustical or sound rated partitions indicated on Drawings to provide a continuous joint and complete sound rated partition assembly.

3.04 FIELD QUALITY CONTROL

A. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.

B. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

3.05 EXTERIOR JOINT-SEALANT SCHEDULE

A. General: Subject to compliance with specified requirements, provide the following sealants at the locations indicated.

B. Exterior concealed transition joints in air barrier.

1. Provide applicable sealant by air and water barrier system manufacturer.
2. Compatibility: Where joint sealants are installed over air water barrier system, provide written approval from both the joint sealant and air water barrier system manufacturer stating compatibility of products for the specific application.

C. Exterior construction joints in vertical cast-in-place and tilt-up concrete.

1. Joint Sealant Type: EXT-JS-1.

D. Exterior movement joints in concrete unit masonry.

1. Joint Sealant Type: EXT-JS-1 or EXT-JS-2.

E. Exterior movement joints in cast stone or natural stone masonry, including adhered thin veneer.

1. Joint Sealant Type: EXT-JS-1 or EXT-JS-2.

F. Exterior exposed joints in metal panel cladding systems.

1. Joint Sealant Type: EXT-JS-1 or EXT-JS-2.

G. Exterior concealed watertight joints in cladding systems.

1. Joint Sealant Type: EXT-JS-1.

H. Exterior perimeter joints at frames of doors, windows, storefront frames, curtain wall frames, window wall frames, and louvers.

1. Joint Sealant Type: EXT-JS-2. Provide primer as recommended by sealant manufacturer for adjacent wall substrates.

I. Exterior joints within aluminum storefront framing, curtain walls, window wall frames, door and window systems:

1. Joint Sealant Type: EXT-JS-2. Provide primer as required for adjacent wall substrates.

J. All other exterior non-traffic joints.

1. Joint Sealant Type: EXT-JS-1 or EXT-JS-2.

K. Exterior sealant where metal through wall flashing is in direct contact with horizontal steel lintels.

1. Joint Sealant Type: EXT-JS-1 or EXT-JS-2; installed between metal flashing and lintel.
2. For thin veneer cladding assemblies, refer to expansion and compression joint requirements of the cladding specification section.

L. Exterior joints between different materials listed above.

1. Joint Sealant Type: EXT-JS-1 or EXT-JS-2.

M. Exterior joints within structural glazing, aluminum storefront framing, curtain walls, and window systems: Refer to Division 08 Sections for those systems.

N. Exterior Fenestration Threshold Bedding Joints: For setting exterior door thresholds and interior thresholds in wet areas.

1. Joint Sealant Type: EXT-JS-2.

3.06 INTERIOR JOINT SEALANT SCHEDULE

A. Interior vertical movement joints in interior concrete.

1. Joint Sealant Type: INT-JS-1.

B. Interior movement joints in interior masonry.

1. Joint Sealant Type: INT-JS-1.

C. Interior perimeter joints of exterior metal frames.

1. Joint Sealant Type: INT-JS-1.

D. Interior perimeter joints of interior metal frames.

1. Joint Sealant Type: INT-JS-1.

E. Interior non-moving joints between interior painted surfaces and adjacent materials.

1. Joint Sealant Type: INT-JS-1.

F. Interior joints in wet areas between plumbing fixtures, cabinetry/casework and adjacent walls, floors, and counters.

1. Joint Sealant Type: INT-JS-2.

G. Interior sanitary joints in food service and kitchen prep areas:

1. Joint Sealant Type: INT-JS-3.

H. Interior concealed sealants at thresholds and sills.

1. Joint Sealant Type: INT-JS-4.

3.07 TRAFFIC JOINTS - EXTERIOR - SCHEDULE

A. For exterior site and paving sealants, refer to project civil and/or landscaping drawings and specifications.

3.08 TRAFFIC JOINTS - INTERIOR - SCHEDULE

A. Joint Sealant Type: TRF-1.

B. For site concrete paving joint sealants, refer to the requirements of applicable Division 32 section.

3.09 ACOUSTICAL JOINT SEALANT SCHEDULE

A. Interior exposed and non-exposed acoustical applications:

1. Joint Sealant Type: AC-JS-1, AC-JS-2, AC-JS-3; refer to acoustically rated assembly requirements.

3.10 FIRE AND SMOKE RATED JOINT SEALANT SCHEDULE

A. Fire and smoke rated assembly joints:

1. As indicated by fire and smoke rated assemblies.

END OF SECTION

SECTION 08 1113

HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Non-fire-rated hollow metal doors and frames.

B. Fire-rated hollow metal frames.

C. Exterior hollow metal doors and frames.

D. Hollow metal frames for wood doors.

1.03 RELATED REQUIREMENTS

A. Section 09 9000 - Painting and Coating.

1.04 REFERENCES

A. Abbreviations and Acronyms:

1. ANSI: American National Standards Institute.
2. ASCE: American Society of Civil Engineers.
3. HMMA: Hollow Metal Manufacturers Association.
4. NAAMM: National Association of Architectural Metal Manufacturers.
5. NFPA: National Fire Protection Association.
6. SDI: Steel Door Institute.
7. UL: Underwriters Laboratories.

B. Definitions:

1. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or ANSI/SDI A250.8.

C. Reference Standards:

1. ANSI/SDI A250.3 - Test Procedure and Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors and Frames.
2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors.
3. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100).

4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
6. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
7. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
8. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames.
9. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames.
10. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames.
11. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames.
12. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames.
13. UL (DIR) - Online Certifications Directory.
14. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.
15. ICC A117.1 - Accessible and Usable Buildings and Facilities.
16. ITS (DIR) - Directory of Listed Products.
17. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design.

1.05 PREINSTALLATION CONFERENCE

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation to discuss conformance with project requirements, manufacturer installation requirements, affected adjacent materials and system, and site conditions.

1. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors.
2. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

B. Attendees shall include contractor, hollow metal door and frame installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.06 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements

B. Product Data: For each type of product.

C. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Elevations of each frame type.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Include construction details, material descriptions, core descriptions, ratings, and finishes.
5. Locations of reinforcement and preparations for hardware.
6. Details of each different wall opening condition.
7. When applicable, provide details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
8. Details of moldings, and removable stops.

D. Exterior Vertical Fenestration Code Compliance: For exterior framed assemblies, indicate compliance with applicable building code vertical fenestration requirements including air infiltration, U-factor, and SHGC.

E. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

F. Qualification Data: For door inspector.

1. Fire-Rated and Smoke Rated Door Inspector: Submit documentation of compliance with NFPA 80, Section 5.2.3.1.
2. Egress Door Inspector: Submit documentation of compliance with NFPA 101, Section 7.2.1.15.4.
3. Submit copy of DHI Fire and Egress Door Assembly Inspector (FDAI) certificate.

G. Product Test Reports: For each type of fire-rated hollow-metal door and frame assembly for tests performed by a qualified testing agency indicating compliance with performance requirements.

H. Field quality control reports.

1.07 CLOSEOUT SUBMITTALS

A. Record Documents: For smoke rated and fire-rated doors, provide list of door numbers and applicable room name where each door type is located.

B. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80 and NFPA 101. Indicate all doors and frames are labeled as required by applicable code.

C. Special Installer Warranty: Executed warranty meeting specified requirements.

D. Special Manufacturer Warranty: Executed warranty meeting specified requirements. Warranty shall be completed in Owner's name and registered with manufacturer.

1.08 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section, with not less than ten years documented experience.

B. Manufacturer Qualifications: Provide hollow metal items from SDI Certified manufacturer: www.steeldoor.org/sdicertified.php.

C. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.

D. Fire-Rated and Smoke Rated Door Inspector Qualifications: Inspector for field quality control inspections of smoke and fire-rated door assemblies shall meet the qualifications set forth in NFPA 80, section 5.2.3.1 and the following:

1. Door and Hardware Institute Fire and Egress Door Assembly Inspector (FDAI) certification.

E. Egress Door Inspector Qualifications: Inspector for field quality control inspections of egress door assemblies shall meet the qualifications set forth in NFPA 101, Section 7.2.1.15.4 and the following:

1. Door and Hardware Institute Fire and Egress Door Assembly Inspector (FDAI) certification.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

C. Deliver hollow-metal items palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

1. Provide additional protection to prevent damage to factory-finished units.

D. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

E. Store hollow-metal items vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Hollow Metal Doors and Frames:

1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com.
2. Curries, an Assa Abloy Group company: www.assaabloydss.com.
3. Fleming Door Products, an Assa Abloy Group company: www.assaabloydss.com.
4. Mesker, dormakaba Group: www.meskeropeningsgroup.com.
5. Republic Doors, an Allegion brand: www.republicdoor.com.
6. Steelcraft, an Allegion brand: www.allegion.com.

2.02 PERFORMANCE REQUIREMENTS

A. General: If a particular unit is indicated to comply with more than one type of requirement, the requirements shall be combined and the door shall comply with the most stringent requirements.

B. Requirements for Hollow Metal Doors and Frames:

1. General: Units shall comply with NAAMM HMMA 861.
2. Steel Sheet: Comply with one or more of the following requirements; galvannealed steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
3. Accessibility: Comply with ICC A117.1 and ADA Standards.
4. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.
5. Door Edge Profile: Hinged edge, top and bottom edges; square. Lock edge; beveled 1/8 inch in 2 inches. Round edges of double-acting doors a 2-1/8 inch radius. Non-handed door blanks with filler plates are not acceptable.
6. Typical Door Face Sheets: Flush.
7. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
8. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvannealed) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.

9. Fire Rating: Provide fire rated units as indicated.

C. Requirements for Hollow Metal Frames for Wood Doors:

1. Steel Sheet: Comply with one or more of the following requirements; galvannealed steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
2. Accessibility: Comply with ICC A117.1 and ADA Standards.
3. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements. Requirements of this Section establish minimum requirements. Where conflict is found, the more stringent requirement shall apply.
4. Hardware Reinforcement for Hollow Metal Doors: Fabricate from the same material as door to comply with the following:
   a. Hinges and Pivots: 7 gauge thick by 1-1/2 inches wide by 6 inches longer than hinge, secured by not less than 6 spot welds.
   b. Lock Face, Flush Bolts, Closers, and Concealed Holders: 12 gauge.
   c. All Other Surface-Mounted Hardware: 16 gauge.
5. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvannealed) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal frames.
6. Fire Rating: Provide fire rated units as indicated.

D. Hollow Metal Panels: Same construction, performance, and finish as doors.

E. Energy Efficiency: Exterior entrance doors and framed assemblies shall comply with applicable project building code vertical fenestration requirements including air infiltration, U-factor, and SHGC.

F. Windborne-Debris-Impact Resistance Performance: Shall be tested in accordance with ASTM E1886, information in ASTM E1996, and TAS 201/203.

1. Large - Missile Impact: For openings located within 30 feet of grade.

2.03 HOLLOW METAL DOORS

A. General: Construct doors with smooth, flush surfaces without visible joints or seams on exposed faces or edges. Doors and frames shall be free of defects, warp, or buckle. Weld exposed joints continuously; grind fill, dress and make smooth, flush, and invisible.

1. Provide weep holes in bottom edge of exterior doors for trapped water drainage.
2. All hollow metal doors shall be constructed with minimum 6” vertical stiles, 8” top rails, and 10” bottom rails. Doors with exit devices shall have minimum 8” center rails.

B. Door Configuration: Refer to Door Schedule.

C. Exterior Doors: Thermally insulated.

1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    a. Level 4 - Maximum-duty.
    b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
    c. Model 1 - Full Flush.
    d. Door Face Metal Thickness: 14 gage, 0.067 inch (1.7 mm), minimum.
    e. Zinc Coating: A60/ZF180 galvannealed coating; ASTM A653/A653M.
2. Door Core Material: Vertical steel stiffeners with fiberglass batts.
    a. Foam Plastic Insulation: Manufacturer's standard board insulation with maximum flame spread index (FSI) of 75, and maximum smoke developed index (SDI) of 450 in accordance with ASTM E84, and completely enclosed within interior of door.
3. Door Thermal Resistance: R-Value of ___.
4. Top Closures: Flush with top of faces and edges. Full flush edges, fully welded.
5. Door Face Sheets: Flush.
6. Weatherstripping: Integral, recessed into door edge or frame. Full perimeter of door.
7. Door Weather Sweep: Provide manufacturer standard door sweep with EPDM insert for full width of door. Designed for application to exterior door bottoms and with concealed fasteners on mounting strips.
8. Door Finish: Factory primed and field finished.
9. Thresholds: At exterior doors, provide manufacturer's standard mill finish aluminum threshold with cutouts coordinated for operating hardware, with anchors and jamb clips, and not more than 1/2-inch- high, with beveled edges providing a floor level change with a slope of not more than 1:2. Thresholds shall comply with applicable accessibility standards. Coordinate with project door hardware specification requirements, as applicable.

D. Interior Doors, Non-Fire-Rated, Non-Smoke-Rated:

1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    a. Level 3 - Extra Heavy-duty.
    b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
    c. Model 1 - Full Flush.
    d. Door Face Metal Thickness: 16 gage, 0.053 inch (1.3 mm), minimum.
2. Door Thickness: 1-3/4 inch (44.5 mm), nominal.
3. Top Closures: Flush with top of faces and edges. Full flush edges, fully welded or manufacturer standard screw attached closures.

4. Door Face Sheets: Flush.

2.04 HOLLOW METAL FRAMES

A. Doors, frames, frame anchors, and hardware reinforcings shall be provided to meet the requirements of the performance levels indicated for doors. The more stringent requirement shall apply.
   1. Provide frames with corners mitered, reinforced, and continuously welded full depth and width of frame.
   2. Knockdown frames are not acceptable.
   3. Weld exposed joints continuously; grind fill, dress and make smooth, flush, and invisible.
   4. Form fixed stops integral with frame.

B. Exterior Door Frames: Full profile/continuously welded type.
   1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A60/ZF180 coating.
   2. Frame Metal Thickness: 14 gage, 0.067 inch (1.7 mm), minimum.
   3. Frame Finish: Factory primed and field finished.
   4. Weatherstripping: Integral, recessed into frame edge.

C. Interior Door Frames, Non-Fire Rated and Non-Smoke Rated: Full profile/continuously welded type.
   1. Frame Metal Thickness: 16 gage, 0.053 inch (1.3 mm), minimum.
      a. For openings up to and including 48 inches wide, form from 16 gauge cold or hot-rolled steel sheet.
      b. For openings more than 48 inches wide, form from 14 gauge cold- or hot-rolled steel sheet.
   2. Frame Finish: Factory primed and field finished.

D. Interior Door Frames, Fire-Rated and Smoke Rated: Full profile/continuously welded type.
   1. Fire Rating: Same as door, labeled.
   2. Frame Metal Thickness: 16 gage, 0.053 inch (1.3 mm), minimum.
   3. Frame Finish: Factory primed and field finished.

E. Frame Hardware Reinforcement: Fabricate from same material as frame for the following hardware:
   1. Hinges and Pivots: 7 gauge thick by 1-1/2 inches wide by 6 inches longer than hinge, secured by not less than 6 spot welds.
   2. Strikes, Flush Bolts, and Closers: 12 gauge.
   3. Surface-Mounted Hold-Open Arms and Panic Devices: 12 gauge.

F. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door application.

G. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on Drawings.

H. Lite Frames: Construction and face dimensions to match door frames, and as indicated on Drawings.

I. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or concrete walls, and at frames indicated to be grouted.

2.05 FINISHES

A. General: Field or factory finish as indicated on Drawings.

B. Factory Primer Finish: Factory primed complying with ANSI/SDI A250.3 for field finishing.

1. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10.

C. Field Finishing: Field painted finish in accordance with Section 09 9000 - Painting and Coating.

D. Bituminous Paint/Coating: Refer to Section 07 1115 - Protective Bituminous Paint Coating.

1. Coordinate with requirements of product/material manufacturer(s) of this Section.
2. For use as corrosion protection between dissimilar materials.
3. Apply in two coats for full coverage minimum 30 dry mil thickness, unless indicated otherwise.

2.06 ACCESSORIES

A. Fasteners: Provide tamper proof fasteners in all locations.

B. Louvers:

1. Characteristics: Factory installed and in compliance with SDI 111C.
    a. Material: Roll formed steel. Blades or baffles formed of 0.020-inch-thick, cold-rolled steel sheet set into 0.032-inch-thick steel frame.
    b. Frame: Concealed design.
    c. Fasteners: Exposed tamper proof.
    d. Factory installed.
2. Style:
    a. Sightproof Louver: Stationary louvers constructed with inverted V-shaped or Y shaped blades.
    b. Fire-Rated and Smoke-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible link, and listed and labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same testing.

3. Locations: Where indicated on Drawings.
4. Finish: Factory-painted finish.
5. Color: As selected by Architect.

C. Glazing: As specified in Section 08 8000, factory installed.

D. Astragals for Double Doors: Refer to Door Hardware specification

E. Mechanical Fasteners for Concealed Metal-to-Metal Connections: Self-drilling, self-tapping, steel with electroplated zinc finish.

F. Grout for Frames: Portland cement grout with maximum 4 inch (102 mm) slump for hand troweling; thinner pumpable grout is prohibited. Refer to 04 0511 - Mortar and Masonry Grout, for additional requirements.

G. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

H. Hardware: Refer to Door Hardware specifications.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 FRAME PREPARATION FOR GROUTED FRAMES

A. Coat inside of frames to be installed in masonry walls, concrete walls, and frames indicated to be grouted; with bituminous coating, prior to installation. Minimum two coat application for minimum 30 dry mil finished thickness.

3.03 PREPARATION FOR HARDWARE AND ANCHORS

A. Reinforcement: Factory reinforce door and frame components for hardware installation in accord with ANSI/SDI A250.8 and ANSI/SDI A250.6.

B. Prepare doors and frames to receive hardware, including cutouts, reinforcement, mortising, drilling, and tapping, according to final door hardware schedule and templates provided by hardware supplier.

C. Comply with applicable requirements of ANSI A115 Series specifications for door and frame preparation for hardware.

D. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site.

E. Install hardware reinforcement and anchors without distortions or blemishes on exposed surfaces.

3.04 INSTALLATION

A. Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.

B. Install fire rated units in accordance with NFPA 80.

C. Coordinate frame anchor placement with wall construction.

D. Floor Anchors: Secure with post installed expansion anchors. Floor anchors may be set with power-actuated fasteners instead of post installed expansion anchors if so indicated and approved on Shop Drawings.

E. Install door hardware in accordance with manufacturer instructions.

1. Comply with recommended practice for hardware placement of doors and frames in accordance with ANSI/SDI A250.6 or NAAMM HMMA 861.

F. Coordinate installation of electrical connections to electrical hardware items.

G. Touch up damaged factory finishes prior to field finishing.

H. Field finish in accordance with Section 09 9000 - Painting and Coating.

3.05 TOLERANCES

A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.

B. Hollow Metal Frame Minimum Installation Tolerances:

1. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
2. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
3. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
4. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

C. Hollow-Metal Door Minimum Installation tolerances: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.

1. Non-Fire-Rated Steel Doors: Comply with ANSI/SDI A250.8.
2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
3. Smoke-Control Doors: Install doors according to NFPA 105.

D. Maximum Diagonal Distortion: 1/16 inch (1.6 mm) measured with straight edge, corner to corner.

3.06 ADJUSTING

A. Adjust for compliance with ADA accessibility requirements.

B. Adjust for smooth and balanced door movement.

C. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

3.07 REPAIR

A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

C. Factory-Finish Touchup: Clean abraded areas and repair with same material used for factory finish according to manufacturer's written instructions.

D. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

3.08 FIELD QUALITY CONTROL

A. Inspection Agency: Contractor shall engage a qualified inspector to perform inspections and to furnish reports to Architect.

B. Fire-Rated and Smoke Rated Door Inspections: Inspect each fire-rated and smoke-rated door and frame in accordance with applicable project codes including NFPA 80, Section 5.2.

1. Prepare and submit separate inspection report for each fire rated and smoke rated door assembly indicating compliance with each item listed in NFPA 80 and NFPA 101.

C. Egress Door Inspections: Inspect each door equipped with panic hardware, each door equipped with exit hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements in accordance with applicable project codes including NFPA 101, Section 7.2.1.15.

1. Prepare and submit separate inspection report for each egress door assembly indicating compliance with each item listed in NFPA 80 and NFPA 101.

D. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

E. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

END OF SECTION

SECTION 08 1416

FLUSH WOOD DOORS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Solid-core flush wood doors.

1.03 REFERENCES

A. Reference Standards

1. ANSI A208.1 - American National Standard for Particleboard.
2. ASTM E2112 - Standard Practice for Installation of Exterior Windows, Doors and Skylights.
3. AWI (QCP) - Quality Certification Program.
4. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards.
5. AWMAC (GIS) - Guarantee and Inspection Services Program.
6. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards.
7. NEMA LD 3 - High-Pressure Decorative Laminates.
8. NFPA 80 - Standard for Fire Doors and Other Opening Protectives.
9. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives.
10. UL (DIR) - Online Certifications Directory.
11. UL 10B - Standard for Fire Tests of Door Assemblies.
12. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies.
13. WDMA I.S. 1A - Interior Architectural Wood Flush Doors.
14. WI (CCP) - Certified Compliance Program.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation to discuss conformance with project requirements, manufacturer installation requirements, affected adjacent materials and system, and site conditions.

1. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems. Coordinate with adjacent and affected materials and systems.

B. Attendees shall include contractor, door installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: For each type of product, including the following:

1. Door core materials and construction.
2. Door edge construction
3. Door face type and characteristics.
4. Door veneer species.
5. Door louvers.
6. Door trim for openings.
7. Door frame construction.
8. Factory-machining criteria.
9. Factory-finishing specifications.

C. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:

1. Door schedule indicating door and frame location, type, size, ratings, and swing.
2. Door schedule indicating door and frame location, type, size, and swing.
3. Door elevations, dimension and locations of hardware, cutouts for glazing and louvers as applicable, and glazing thicknesses.
4. Details of frame for each frame type, including dimensions and profile.
5. Dimensions and locations of blocking for hardware attachment.
6. Dimensions and locations of mortises and holes for hardware.
7. Clearances and undercuts.
8. Requirements for veneer matching.
9. Requirements for doors to be factory finished.
10. Indicate that doors meet specified requirements including fire ratings.

D. Certificate: Submit labels and certificates required by quality assurance and quality control programs.

E. Samples:

1. Corner sections of doors, approximately 8 by 10 inches, with door faces and edges representing actual materials to be used.
2. Frames for light openings, 6 inches long, for each material, type, and finish required.

3. Submit a minimum of 3 samples of each face veneer, minimum 12 by 12 inches in size, representative of proposed species, cut, color and grain, with proposed factory finish.
4. Accepted samples shall establish references for extremes of color, graining, defects and general quality of proposed veneers.

F. Qualification Data: For door inspector.
1. Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, Section 5.2.3.1.
2. Egress Door Inspector: Submit documentation of compliance with NFPA 101, Section 7.2.1.15.4.
3. Submit copy of DHI's Fire and Egress Door Assembly Inspector (FDAI) certificate.

G. Sample Warranty: For special warranty.
1. Manufacturer Intent to Warranty Letter: Submit an Intent to Warrant executed by authorized warranty representative of door manufacturer, indicating that;
a. Manufacturer has reviewed project drawings, specifications, shop drawings, and conditions affecting the work and the relationship of doors with related work.
b. Manufacturer agrees to warrant proposed project upon successful completion as referenced herein without additional requirements.

1.06 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements. Warranty shall be completed in Owner's name and registered with manufacturer.

C. Field quality-control reports.

D. Provide executed copy of specified warranty for project.

E. Quality Standard Compliance Certificates: Provide program compliance certificates.

F. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

G. Maintenance Data: Provide manufacturer parts lists, operation, and maintenance instructions for the materials of this Section.

1.07 QUALITY ASSURANCE

A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section, with not less than ten years of documented experience.
1. Company with at least one project within the past 5 years with value of woodwork within 20 percent of cost of woodwork for this project.

2. Accredited participant in the specified certification program prior to the commencement of fabrication and throughout the duration of the project.

C. Installer Qualifications: Company specializing in performing work of the type specified in this Section, with not less than five years of documented experience.

D. Allowable color and grain variation of natural finished doors: Color and grain shall be uniform and within range established by accepted veneer samples as specified herein. Joints in face veneers shall be inconspicuous. Adjacent doors and doors viewed together shall have similar color and grain.

E. Fire Rated and Smoke Rated Door Assemblies:

1. Door assemblies in rated walls shall have been tested in accord with NFPA 252 or UL 10C.
2. Door assemblies in corridors and smoke barriers shall have a minimum fire rating of 20 minutes and shall have been tested in accord with NFPA 252 or UL 10C without hose stream test. Assemblies shall comply with UL 1784 for draft and smoke control test; leakage may not exceed 3.0 CFM per foot of door at 0.10" of water column.
3. Fire-rated doors shall provide rating without use of salt-treated wood, or manufacturer shall provide certification that treated wood is nonhygroscopic and shall warrant door against failure or discoloration of face veneer and door finish.

F. Labeling requirements:

1. On top edge, provide each door with a label which identifies manufacturer, trade association of which he is a member, grade and type of door or industry standard with which it complies.
2. Fire-rated components shall bear factory-applied labels showing manufacturer’s name, name of third-party inspection agency, fire protection rating, and where required for doors in exit enclosures, maximum transmitted temperature end point. Permanently attach label to hinge stile of each fire-rated door.
3. Smoke and draft doors complying only with UL 1784 shall show the letter ‘S’ on the manufacturer’s labeling.

G. Face veneers shall be domestically assembled veneer facing using no rainforest produced crossbands or backs.

H. Source Requirements: All doors shall be provided by the same manufacturer.

I. Quality Certification:

1. Comply with AWI (QCP) woodwork association quality certification service/program in accordance with requirements for work specified in this Section: www.awiqcp.org.
2. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) requirements for grade or grades specified.
3. Provide designated labels on shop drawings as required by certification program.
4. Provide designated labels on installed products as required by certification program.

5. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

J. Fire-Rated and Smoke Rated Door Inspector Qualifications: Inspector for field quality-control inspections of fire-rated and smoke rated door assemblies shall comply with qualifications set forth in NFPA 80, Section 5.2.3.1 and the following:

1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.

K. Egress Door Inspector Qualifications: Inspector for field quality-control inspections of egress door assemblies shall comply with qualifications set forth in NFPA 101, Section 7.2.1.15.4 and the following:

1. DHI's Egress Door Assembly Inspector (FDAI) certification.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Package, deliver and store doors in accordance with specified quality standard.

B. Accept doors on site in manufacturer's packaging. Inspect for damage.

C. Protect doors with resilient packaging. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges if stored more than one week. Break seal on site to permit ventilation.

D. Comply with requirements of referenced standard and manufacturer's written instructions.

E. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.09 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and HVAC system is operating and maintaining temperature and relative humidity at levels designed for building occupants for the remainder of construction period.

1.10 WARRANTY

A. Special Manufacturer Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Delamination of veneer.
   b. Warping (bow, cup, or twist) more than 1/4 inch (6.4 mm) in a 42-by-84-inch section.
   c. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
2. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
3. Warranty Period for Solid-Core Interior Doors: Life of installation.

B. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.
   1. Warranty Period: One year from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: Products by VT Industries. www.vtindustries.com.
   1. Drawing Designation: DR-1.

B. Wood Veneer Faced Door Manufacturers: Subject to compliance with requirements.
   1. Masonite Architectural. https://architectural.masonite.com/products/
   2. Oregon Door. www.oregondoor.com.
   3. Lambton Doors. www.lambtondoors.com
   4. TruStile Doors. www.trustile.com
   5. Oshkosh Door Company. www.oshkoshdoor.com
   6. VT Industries. www.vtindustries.com.

2.02 DOORS AND PANELS

A. Doors: Refer to drawings for locations and additional requirements.
   1. Quality Standard: Premium Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS), unless noted otherwise.
   2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.

B. Wood Veneer Faced Doors: Flush construction.
   1. Thickness: As indicated on Drawings. Where not indicated, as selected by Architect.
   2. Provide solid core doors at each location.
   3. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled.
      a. Provide visible labels on hinge edge when door is open.
   4. Smoke and Draft Control Doors (Indicated as "S" on Drawings): In addition to required fire rating, provide door assemblies tested in accordance with UL 1784 with maximum air leakage of 3.0 cfm per sq ft (0.01524 cu m/s/sq m) of door opening at 0.10 inch wg (24.9 Pa) pressure at both ambient and elevated temperatures for "S" label; if necessary, provide additional gasketing or edge sealing.

2.03 DOOR AND PANEL CORES

A. General: If a particular unit is indicated to comply with more than one type of requirement, the requirements shall be combined and the door shall comply with the most stringent needed to meet each requirement.

B. Non-Rated Solid Core and 20 Minute Rated Doors: Type structural composite lumber core (SCLC), plies and faces as indicated.

1. Non-rated doors shall have a particleboard core complying with ANSI 208.1, Grade LD-2 and 5 plies with stiles and rails bonded to core, then entire unit abrasive planed before faces are applied.

C. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

2.04 DOOR FACINGS

A. Veneer Facing for Transparent Finish: White oak, veneer grade in accordance with quality standard indicated, cut as selected by Architect, with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.

1. Vertical Edges: Same species as face veneer.

B. Facing Adhesive: Type I or Type II, as required to comply with door rating, and door finish quality.

2.05 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.

B. Blocking: At door cores constructed with stiles and rails.

1. Provide solid blocks at lock edge and top of door for closer for hardware reinforcement.
2. Provide solid blocking for other throughbolted hardware.
3. Doors shall be constructed with 6” vertical stiles, 8” top rails and 10” bottom rails. Doors with exit devices shall have minimum 8” center rails.
4. Top and bottom rail and lock stile blocking shall accommodate specified hardware, without through-bolting hardware.

C. Vertical Stiles:

1. Stiles for Non-Fire Rated Doors: Minimum 1-3/8" wide by thickness of core with specified veneer, solid hardwood or structural composite lumber inner stile backer with edge veneer matching face veneer in specie, color and graining; no exposed finger joints allowed.

2. Stiles for Fire-Rated Doors: Minimum 1-3/8" wide by thickness of core with specified veneer, solid hardwood or lamination meeting fire rating requirements; edge veneer matching face veneer.
    a. 20-minute rated pairs without metal edges or astragals: As required by manufacturer to permit positive pressure "S" label per Category H; veneer banded to match face veneer over manufacturer's edge for improved screw holding.
    b. Mineral core doors required to meet positive pressure Category A (concealed) requirements: As required by door manufacturer.
3. Pairs of fire-rated doors:
    a. With metal edges or metal edges and astragals: As required by door manufacturer's test data for required fire-ratings, wrapped with veneer matching face in species, color and graining.
    b. Without metal edges or metal edges and astragals: As required by door manufacturer's test data for required fire-ratings.
4. For 20 minute doors: Treated stiles at meeting edge.
    a. Mineral core doors required to meet positive pressure Category A (concealed) requirements: As required by door manufacturer.
5. Stile width for doors with cutouts:
    a. Non-rated doors: Provide minimum 5" of core between lock and light cutout or from edge of door to edge of cutout.
    b. Rated doors: Provide minimum 5-1/2" core between lock and cutout or from edge of door and edge of cutout.
    c. Opening next to lock: Provide minimum 10" lock stile.
6. Rails: Mill option hardwood or structural composite lumber and as required to meet positive pressure ratings.
    a. Top rail for Doors with Closers: Provide minimum 12" high top rail for doors scheduled to receive closers. Top rail shall accommodate specified hardware without through-bolting hardware.

D. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

E. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.

F. Provide edge clearances in accordance with the quality standard specified.

2.06 FACTORY FINISHING - WOOD VENEER DOORS

A. Finish work in accordance with AWI/AWMAC/WI (AWS), Section 5 - Finishing for grade specified.
    1. Transparent:

a. System - 11, Polyurethane, Catalyzed.

b. Sheen: As selected by Architect from manufacturer full range.

c. Stain Color: As selected by Architect from manufacturer full range including custom colors.

B. Factory finish doors in accordance with approved sample.

C. Seal door top edge with color sealer to match door facing.

D. Finish all door edges to match door facing.

2.07 LIGHT FRAMES

A. Wood Beads for Light Openings in Non-Fire Rated Wood Doors: Provide manufacturer's standard wood beads unless otherwise indicated.

1. Selection: VT1 (100) by VT Industries.

2. Wood Species: Same species as door faces.

3. Profile: Flush rectangular beads.

4. Finish and Color: Match door finish.

5. At wood-core doors with 20-minute fire-protection ratings, provide wood beads and metal glazing clips approved for such use.

B. Wood-Veneered Beads for Light Openings in Fire-Rated Doors: Manufacturer's standard wood veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire-protection rating indicated. Include concealed metal glazing clips where required for opening size and fire-protection rating indicated.

C. Metal Frames for Light Openings in Fire-Rated Doors: Manufacturer's standard frame formed of 0.048-inch-thick, cold-rolled steel sheet; factory primed for paint or with baked-enamel- or powder-coated finish; and approved for use in doors of fire-protection rating indicated.

D. Metal Frames for Light Opening: Manufacturer's standard frame formed of 0.048-inch-thick, cold-rolled steel sheet; factory primed for paint or with baked-enamel- or powder-coated finish.

2.08 ACCESSORIES

A. Fasteners: Provide tamper proof fasteners in all locations.

B. Hollow Metal Door Frames: As specified in Section 08 1113.

C. Louvers, Metal:

1. Characteristics: Factory installed.

a. Material: Roll formed steel. Blades or baffles formed of 0.020-inch-thick, cold-rolled steel sheet set into 0.032-inch-thick steel frame.

b. Frame: Concealed design.

c. Fasteners: Exposed tamper proof.

2. Style:

a. Sightproof Louver: Stationary louvers constructed with inverted V-shaped or Y shaped blades.

b. Fire-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible link, and listed and labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same testing.

3. Locations: Where indicated on Drawings.

4. Finish: Factory-painted finish.

5. Color: As selected by Architect.

D. Louvers, Wood:

1. Louvers for Fire-Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire-protection rating of 1-1/2 hours and less.

a. Metal and Finish: Hot-dip galvanized steel, 0.040 inch thick, factory primed for paint or with baked-enamel- or powder-coated finish.

2. Louvers for Non-Fire Rated Doors:

a. Characteristics: Factory installed.

b. Material: Provide door manufacturer's standard solid-wood louvers, unless otherwise indicated.

c. Wood Species: Same species as door faces.

d. Fasteners: Concealed; countersunk, filled, and finished.

e. Style: Chevron (inverted V) with perimeter frame.

f. Locations: Where indicated on Drawings.

g. Finish: Same as door.

E. Glazing: As specified in Section 08 8000.

F. Glazing Stops: Rolled steel channel shape, mitered corners; prepared for countersink style tamper proof screws.

G. Astragals for Double Doors: Steel, T shaped, overlapping and recessed at face edge.

H. Door Hardware: As specified in Section 08 7100.

2.09 FACTORY FITTING, MACHINING AND FINISHING:

A. Factory fitting and machining are required for all wood doors. Factory finishing is required for all transparent finished doors.

B. Fitting and machining:

1. Factory fit and machine doors to clearances and bevels specified.

2. Prepare for hardware installation using hardware manufacturer's templates.

a. Locate in accord with WDMA I. S. 1.7, unless otherwise indicated.

b. Drill pilot holes for screws and bolts.

3. Seal edges of doors and cutouts immediately following fitting and machining.

C. Openings:

1. Cut openings to receive glass lites in accord with AWS requirements or WDMA I. S. 1-A.

2. Seal edges of cutout immediately following cutting using one coat of solvent type sealer.

3. Install glass lites without looseness or rattle. Attach applied stops using countersunk oval head, phillips head machine screws at 1'-0" o.c., maximum, and maximum 3" from each end.

4. Protect door faces from damage during cutting.

5. Prepare and glaze openings in fire-rated doors in accord with NFPA and UL requirements.

D. Clearances and bevel:

1. Hinge stile: 1/8".

2. Lock stile: 1/8".

3. Top: 1/8".

4. Bottom: 1/4" above floor finish or threshold, except where undercutting is indicated. Confirm installed floor covering thickness before cutting door bottom edges.

5. Meeting stiles, pairs of doors: 1/8".

6. Bevel: 1/8" in 2".

2.10 FABRICATION TOLERANCES

A. Overall dimension: ±1/16".

B. Width: +1/32".

C. Maximum warp, bow, cup or twist: 1/4".

D. Squareness: Maximum 1/8" difference in diagonal measurement.

E. Hardware locations: -0", +1/32".

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

D. Examine doors and installed door frames, with Installer present, before hanging doors.

1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
2. Reject doors with defects.

E. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 INSTALLATION

A. Allow doors to become acclimated to finished space conditions a minimum of 72 hours before hanging. Coordinate with manufacturer instructions.

B. Install doors in accordance with manufacturer's instructions and specified quality standard.

1. Install fire-rated doors in accordance with NFPA 80 requirements. Comply with applicable code requirements.
2. Install smoke and draft control doors in accordance with NFPA 105 requirements. Comply with applicable code requirements.
3. Install exterior doors in accordance with ASTM E2112.

C. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.

D. Use machine tools to cut or drill for hardware.

E. Coordinate installation of doors with installation of frames and hardware.

F. Coordinate installation of glazing.

G. Install door louvers plumb and level.

3.03 TOLERANCES

A. Comply with specified quality standard for fit and clearance tolerances.

B. Comply with specified quality standard for telegraphing, warp, and squareness.

C. Maximum Erection tolerances:

1. Variation from specified clearances: 1/32 inch.
2. Maximum variation in edge alignment, pairs of doors: 1/16 inch.

3.04 ADJUSTING

A. Adjust for compliance with ADA accessibility requirements.

B. Adjust doors for smooth and balanced door movement.

C. Adjust closers for full closure.

D. Adjust sound control doors so that seals are fully engaged when door is closed.

E. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

3.05 FIELD QUALITY CONTROL

A. Inspection Agency: Contractor shall engage a qualified inspector to perform inspections and to furnish reports to Architect.

B. Fire-Rated Door Inspections: Inspect each fire-rated door in accordance with NFPA 80, Section 5.2.

1. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80 and NFPA 101.

C. Egress Door Inspections: Inspect each door equipped with panic hardware, each door equipped with fire exit hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements in accordance with NFPA 101, Section 7.2.1.15.

1. Prepare and submit separate inspection report for each egress door assembly indicating compliance with each item listed in NFPA 80 and NFPA 101.

D. Wood Door Inspections: Provide inspection of installed Work through AWI's Quality Certification Program, certifying that wood doors and frames, including installation, comply with requirements of AWI/AWMCA/WI's "Architectural Woodwork Standards" for the specified grade.

E. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

F. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

END OF SECTION

SECTION 08 3100

ACCESS DOORS AND PANELS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Wall, ceiling, and soffit access door and access panel units.

1.03 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation to discuss conformance with project requirements, manufacturer installation requirements, affected adjacent materials and system, and site conditions.

B. Attendees shall include contractor, access door installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.04 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, fire ratings, and details of adjoining work.

C. Shop Drawings: Indicate exact location of each access door and/or panel unit.

1. Include construction details, fire ratings, material descriptions, dimensions of individual components and profiles, and finishes.

D. Manufacturer's Installation Instructions: Indicate installation requirements.

E. Qualification Data: For testing and inspecting agency.

1. Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, section 5.2.3.1.

2. Submit copy of DHI Fire and Egress Door Assembly Inspector (FDAI) certificate.

1.05 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements.

C. Maintenance Data: Provide manufacturer parts lists, operation, and maintenance instructions for the materials of this Section.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum five years documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years documented experience.

C. Fire-Rated Door Inspector Qualifications: Inspector for field quality control inspections of fire-rated door assemblies shall meet the qualifications set forth in NFPA 80, section 5.2.3.1 and the following:

1. Door and Hardware Institute Fire and Egress Door Assembly Inspector (FDAI) certification.

1.07 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.

1. Warranty Period: One year from date of Substantial Completion.

B. Special Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, where items fail to perform as designed and manufactured.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Fire-Rated Access Doors and Frames: For installations in fire rating assemblies, provide access door, frame, and panel assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection and temperature-rise limit ratings indicated, according to NFPA 252 or UL 10B.

B. Exterior Access Door and Panels: Shall comply with applicable code requirements for exterior openings including resisting the passage of water, continuous air barrier, and continuous thermal insulation requirements.

C. Windborne-Debris-Impact Resistance Performance: Shall be tested in accordance with ASTM E1886, information in ASTM E1996, and TAS 201/203.

1. Large - Missile Impact: For exterior openings located within 30 feet of grade.

2.02 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with requirements.

1. Activar Construction Products Group - JL Industries: www.activarcpg.com.
2. ACUDOR Products Inc: www.acudor.com.
3. Babcock-Davis: www.babcockdavis.com.
4. Cendrex, Inc: www.cendrex.com.
5. Karp Associates, Inc: www.karpinc.com.
6. Milcor, Inc: www.milcorinc.com.
7. Nystrom, Inc: www.nystrom.com.
8. Studco Building Systems: www.studcosystems.com.

2.03 WALL AND CEILING MOUNTED UNITS, GENERAL

A. Wall and Ceiling Mounted Units: Factory fabricated door and frame, fully assembled units with corner joints welded, filled and ground flush; square and without rack or warp; coordinate requirements with type of installation assembly being used for each unit.

1. Size: As indicated on drawings; 24 by 24 inches minimum, unless noted otherwise.
2. Material, All Locations: Steel, galvanized, galvannealed, or galvalume; factory primed for field painting. Basis of design color shall be color required to match adjacent wall finish.
3. Style: Recessed door panel for infill with wall/ceiling finish, unless indicated otherwise.
    a. Gypsum Board Mounting Criteria: Use drywall bead type frame.
4. Door Style: Double-skinned hollow panel.
5. Heavy Duty Frames: 14 gage, 0.0747 inch (1.89 mm), minimum thickness.
6. Heavy Duty Single Steel Sheet Door Panels: 14 gage, 0.0747 inch (1.89 mm), minimum thickness.
7. Insulation: Non-combustible mineral wool or glass fiber.
8. Door/Panel Size: As indicated on the drawings.
9. Hardware:
    a. Hardware for Fire-Rated Units: As required for listing, provide concealed hinges to match non fire rated units unless not permitted by fire rating requirements.
    b. Hinges for Non-Fire-Rated Units: Concealed, hinged-arm guide at top and bottom of panel.
    c. Hinge Range of Motion: Provide 175-degree range of operation.
    d. Handle: Fixed.
    e. Inside Latch Release: Mechanism that allows door/panel to be opened from inside. Only required for doors/panels larger than 12 inches in any direction.
    f. Gasketing: Extruded neoprene, around perimeter of door panel. Ensure air-tight seal.

2.04 PRODUCTS, BASIS OF DESIGN, INTERIOR LOCATIONS

A. Interior Non-Fire Rated - Recessed Flush Access Doors with Concealed Flanges:
   1. For interior applications only.
   2. Characteristics:
      a. Door face recessed for 1/2 inch or 5/8 inch gypsum board installations.
      b. Designed for highly non-visible final appearance after installation in walls or ceilings. Typical 1/16 inch wide visible perimeter void.
      c. Designed for new construction or renovation/repair installations.
      d. Continuous air and smoke tight perimeter gasket.
      e. Concealed mechanical touch latch.
      f. Hinge: Continuous piano hinge.
      g. Gasketing: Manufacturer provided perimeter gasket for air and dust control.
      h. Size: 24 by 24 inch or 48 by 48 inch size. Coordinate with requirements indicated on Drawings.
   3. Installation:
      a. Gypsum Board Substrate Installation: Provide concealed flange and concealed continuous hinge.
      b. Acoustical Tile Grid Installation: Provide with no bead and concealed hinge.
   4. Finish: Manufacturer standard powder coated or baked enamel factory white finish to match adjacent ceiling.
   5. Basis of Design:
   6. Acceptable Products:
      a. Basis-of-Design is Bauco “BP-58 Bauco Plus II”, with touch latch.
      b. Acudor Product Inc. “DW-5058”.
      c. Babcock-Davis “BRGB”.
      d. Nystrom, Inc. “RGB”.

B. Interior Non-Fire Rated - Ceiling Tile Grid Mounted Access Door:
   1. For interior applications only.
   2. Characteristics:
      a. Designed for mounting in suspended "T" shaped acoustical ceiling grid assemblies with door face flush with ceiling grid.
      b. Shall be compatible with ceiling grid indicated.
      c. Materials: 0.063 aluminum door and frame.
      d. Lock/Latch: 4x Flush stainless steel cams.
      e. Hinge: Continuous piano hinge.

f. Concealed mechanical touch latch.

g. Gasketing: Manufacturer provided perimeter gasket for air and dust control.

h. Size: 24 by 24 inch or 48 by 48 inch size. Coordinate with requirements indicated on Drawings.

3. Finish: Manufacturer standard powder coated or baked enamel factory white finish to match adjacent ceiling grid.

4. Installation:

a. Drop in design for ceiling tile grids with manufacturer provided mounting screws for secure installation.

5. Acceptable products:

a. Best Access Doors "BA-TBC".

b. Williams Brothers "WB-TB1210".

C. Interior Fire Rated Units:

1. Basis of Design: Acudor FW Series by Acudor/Nelson Industrial, Inc. www.acudor.com

a. Fire rating as required by applicable code for fire-rated assembly that access doors are being installed.

b. Provide products listed by ITS (DIR) or UL (FRD) as suitable for purpose indicated.

c. Provide certificate of compliance from code officials indicating approval of fire rated doors.

d. Fire Rating (Ceilings): Meets minimum 90 minutes Fire Resistance Rating in accordance with CAN ULC S101, ASTM E119 and NFPA 251. Comply with minimum fire rating requirements of project at installation location.

2. Characteristics:

a. For use in Fire Rated Ceilings that needs tested and certified doors having Fire Resistance Rating of 90 minutes.

b. Door: Steel-22 Gauge recessed fitted with 5/8” thick drywall suitable to accept skim coat finish on site.

c. Door Frame: Steel-22 Gauge press bent for strength and rigidity with pre-punched flanges for convenient mounting and accepting skim coat finish on site

d. Hinge: Concealed

3. Installation:

a. Gypsum Board Substrate Installation: Provide concealed flange and concealed continuous hinge.

4. Latch: Self-latching bolt, operated by flush key.

2.05 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.

2.06 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

2. Field Finishing: Field finishing of factory primed units shall be in accordance with Section 09 9000 - Painting and Coating. Color(s) and sheen(s) shall be as selected by Architect.

a. Basis of design shall be to match adjacent ceiling or wall finish color and sheen. Final selection shall be by Architect in accordance with Section 09 9000.

PART 3 EXECUTION

3.01 EXAMINATION

A. Begin installation only after substrates have been properly prepared, and if the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to proceeding with this work.

B. Prepare surfaces using methods recommended by manufacturer for applicable substrates in accordance with project conditions.

3.03 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. Install frames plumb and level in openings, and secure units rigidly in place. True to line and location.

C. Position units to provide convenient access to concealed equipment when necessary.

D. Install fire rated items in compliance with the requirements of NFPA 80.

3.04 FIELD QUALITY CONTROL

A. Inspection Agency: Contractor shall engage a qualified inspector to perform inspections and to furnish reports to Architect.

B. Fire-Rated Door Inspections: Inspect each fire-rated access door in accordance with NFPA 80, section 5.2.

C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

E. Prepare and submit separate inspection report for each fire-rated access door indicating compliance with each item listed in NFPA 80 and NFPA 101.

3.05 ADJUSTING

A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION

SECTION 08 3324

OVERHEAD COUNTER DOORS-WOOD

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Interior overhead coiling counter doors.

1.03 REFERENCES

A. Reference Standards:

1. ITS (DIR) - Directory of Listed Products.
2. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
3. NFPA 80 - Standard for Fire Doors and Other Opening Protectives.
4. UL (DIR) - Online Certifications Directory.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

B. Attendees shall include contractor, overhead door installer, manufacturer technical representative, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Shop drawings; indicate the following:

1. Locations, elevations and method of attachment.
2. Guide details and method of anchorage to openings.
3. Construction details.
4. Configurations, locations and installation of hardware.
5. Size, shape and thicknesses of materials.

6. Details of tracks, rollers, fittings and other attachments, including installation of counterbalance, operators and automatic closing devices.

C. Product data: Submit manufacturer's installation and operation instructions for doors. Indicate door construction and hardware characteristics.

D. Manufacturer's Installation Instructions: Indicate installation sequence and procedures, adjustment and alignment procedures.

1.06 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements. Warranty shall be completed in Owner's name and registered with manufacturer.

C. Special Manufacturer Finish Warranty: Executed warranty meeting specified requirements.

D. Maintenance Data: Provide manufacturer parts lists, operation, and maintenance instructions for the materials of this Section.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years of documented experience.

B. Installer Qualifications: Company specializing in performing work of type specified and with at least five years documented experience.

C. Products Requiring Electrical Connection: Listed and classified by ITS (DIR), UL (DIR), or testing firm acceptable to authorities having jurisdiction as suitable for purpose specified.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Protect materials from exposure to moisture. Do not deliver until after wet work is complete and dry.

C. Store materials in a dry, warm, ventilated weathertight location.

1.09 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.10 COORDINATION

A. Coordinate Work with other operations and installation of adjacent materials to avoid damage to installed materials.

1.11 WARRANTY

A. Special Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, where items fail to perform as designed and manufactured.

1. Warranty Period: Minimum three years or 100,000 cycles, whichever occurs first.

B. Special Manufacturer Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair finish or replace materials that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Warrantied against cracking, checking and peeling for finishes applied to curtain, guides, bottom bar, headplates.

2. Warranty Period: Five years from date of Substantial Completion.

C. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with requirements.

1. Alpine Overhead Doors, Inc. www.alpinedoors.com.

2. Clopay Building Products. www.clopaydoor.com.

3. Cornell Cookson, LLC. www.cornelliron.com.

4. Overhead Door Corp. www.overheaddoor.com

2.02 PERFORMANCE REQUIREMENTS - NON-GLAZED OVERHEAD DOORS

A. Interior Doors:

1. Operation: Design door assembly, including operator, to operate for not less than 20,000 cycles.

B. Single-Source Responsibility: Provide doors, tracks, motors, and accessories from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.

C. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc. acceptable to authority having jurisdiction as suitable for purpose specified.

2.03 WOOD ROLLING COUNTER DOORS

A. Basis of Design: Model 665 by Overhead Door Company. www.overheaddoor.com

B. Acceptable Products: Subject to compliance with requirements.

1. Wooden Counter Shutter by Alpine Doors. www.alpinedoors.com
2. Model 665 by Overhead Door Company. www.overheaddoor.com

C. Characteristics:

1. Curtain: Wood slats, 1 3/4" high by 1/2" thick.
   a. Wood Species: As indicated on Drawings. Where not indicated, as selected by Architect from manufacturer full range.
   b. Finish: Stained with translucent finish in color and sheen selected by Architect.
2. Hood: Aluminum.
3. Brackets: Steel plate to support curtain, counterbalance, and hood.
4. Guides: Extruded aluminum.
5. Counterbalance: Helical torsion springs housed in a steel tube or pipe barrel.
6. Mounting: Face of wall.
7. Bottom Bar: Wood to match slats.
8. Electric Motor Operation: Provide UL listed electric operator, size and type as recommended by manufacturer to move door in either direction at not less than 2/3 foot nor more than 1 foot per second. Operator shall meet UL325/2010 requirements for continuous monitoring of safety devices.
9. Electric Entrapment Protection: Required for momentary contact, includes radio control operation.
   a. Pneumatic sensing edge up to 18 feet (5.5 m) wide. Constant contact only complying with UL 325/2010.
10. Electric Operator Controls:
    a. Push-button and key operated control stations with open, close, and stop buttons.
    b. Flush mounting.
    c. Interior location.
    d. Mortise keyed locking. Provide minimum 3 keys.
11. Manual Operation: Provide manual chain operator for emergency operation.
    a. Chain hoist, manufacturer standard with chain keeper locks.
    b. Counterbalance: Helical torsion spring type housed in a steel tube or pipe barrel, supporting the curtain with deflection limited to 0.03 inch per foot of span. Counterbalance is adjustable by means of an adjusting tension wheel.
12. Hood: Protecting drive, barrel, chain, and sprocket from dirt and debris and extending between the support brackets. Provide with internal hood baffle weatherseal.
    a. Aluminum hood with intermediate supports as required.

D. Metal Finishes:

1. Curtain and Hood Finish:

a. Factory Finish: Premium powder coat color as selected by the Architect from manufacturer full range.

2. Bottom Bar, Guides, Headplate and Bracket Finish:

a. Factory Finish: Premium powder coat color as selected by the Architect from manufacturer full range.

3. Other Permanently Exposed Metal Surface: Factory black powder coat.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that opening sizes, tolerances and conditions are acceptable.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.

C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.

D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.

3.03 TOLERANCES

A. Maintain dimensional tolerances and alignment with adjacent work.

B. Maximum Variation From Plumb: 1/16 inch (1.6 mm).

C. Maximum Variation From Level: 1/16 inch (1.6 mm).

D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 ft (3.2 mm per 3 m) straight edge.

3.04 ADJUSTING

A. Adjust operating assemblies for smooth and noiseless operation.

3.05 CLEANING

A. Clean installed components.

B. Remove labels and visible markings.

END OF SECTION

SECTION 08 4313

ALUMINUM FRAMED STOREFRONT SYSTEMS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Aluminum-framed storefront, with vision glass.

1.03 REFERENCES

A. Definitions:

1. "Dry Line" or "Wet-Dry Line": The location in the assembly and rough opening that creates a boundary and barrier to prevent water penetration from the exterior to the interior of the assembly and rough opening.
    a. The dry line extends from the adjacent wall assemblies across the rough opening and across the storefront assembly and is the location where water is not intended to pass beyond and if passage occurs, water cannot drain to the exterior. "Water" includes bulk water.
    b. "Dry Line" or "Wet-Dry Line" includes the location that the specific product, system, and/or material manufacturer has designed, engineered, manufactured, and/or fabricated their system to perform the defined wet-dry line role indicated.

B. Building Regulations: Design of system shall comply with Codes and Regulations, Fire Regulations, Safety Regulations and other regulations applicable to the installation, as a minimum standard.

C. Codes and Standards:

1. International Building Code.
2. ICC/ANSI A117.1 - Accessible and Usable Buildings and Facilities.
3. NFPA 101 Life Safety Code.
4. Sealants: The Professionals' Guide, by the Sealant, Waterproofing and Restoration Institute (SWRI).
5. GANA Glazing Manual - Glass Association of North America.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation to discuss conformance with project requirements, manufacturer installation requirements, affected adjacent materials and system, and site conditions.

B. Attendees shall include contractor, storefront installer, and installers of adjacent materials and systems.

C. Coordinate with installation of other components that comprise the exterior enclosure.

D. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents. Coordinate with project Door Hardware specifications.

C. Product Data: Provide manufacturer installation instructions and data for materials of this Section.

D. Shop Drawings: For aluminum-framed storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.

1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
2. Include full-size isometric details of each type of vertical-to-horizontal intersection of systems, showing the following:
    a. Joinery, including concealed welds.
    b. Anchorage.
    c. Expansion provisions.
    d. Glazing.
    e. Flashing and drainage.
    f. Sheet metal trim, and covers.
    g. Clearly identify the path of the "dry line" including continuous water, air, and thermal barriers (i.e. thermal breaks and insulated glass) through the system. Clearly identify the path, location, and continuity of all sealants and their connection to similar systems (i.e. continuous water, air, and thermal barrier) at the rough opening.
3. Delegated-Design Submittal: For aluminum-framed entrances and storefronts indicated to comply with performance requirements and design criteria, including analysis data

signed and sealed by the qualified professional engineer responsible for their preparation.

E. Exterior Vertical Fenestration Code Compliance: For exterior framed assemblies, indicate compliance with applicable building code vertical fenestration requirements including air infiltration, U-factor, and SHGC.

F. Glass Manufacturer Approval: Indicate in letter provided with shop drawings that selected glass manufacturers have reviewed and approved details, glass bite, clearances, interior air circulation around framing, and glazing methods.

G. Samples for Initial Selection: For units with factory-applied color finishes. Provide manufacturer standard printed color charts for selection.

H. Samples for Verification: Following initial selection, for each type of exposed finish required, in manufacturer's standard sizes provide the following only when requested by Architect.

1. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch (300-mm) lengths of full-size components and showing details of the following:

a. Joinery, including concealed welds.

b. Anchorage.

c. Expansion provisions.

d. Glazing.

e. Flashing and drainage.

I. Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

J. Preconstruction Laboratory Mockup Testing Submittals:

1. Testing Program: Developed specifically for specified storefront in application matching this project. Testing of actual item to be installed on the project is not required.

2. Test Reports: Submit results of full-size mock-up testing. Reports of tests previously performed on the same design are acceptable.

3. Record Drawings: As-built drawings of preconstruction laboratory mockups showing changes made during preconstruction laboratory mockup testing.

K. Designer's Qualification Statement.

L. Installer's Qualification Statement.

1.06 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements.

C. Special Manufacturer Finish Warranty: Executed warranty meeting specified requirements.

D. Maintenance Data: Provide manufacturer maintenance instructions for the materials of this Section.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least five years of documented experience.

B. Installer Qualifications: Company specializing in performing work of type specified and with at least five years of documented experience and approved by manufacturer.

C. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

D. Structural-Sealant Glazing: Comply with ASTM C1401 for design and installation of storefront systems.

1.08 MOCKUPS

A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Locate as directed by Architect.
2. Size: Minimum one fabricated unit in configuration directed by Architect.

B. Do not proceed with installation beyond mockup until the mockup installation is approved by Architect. Correct deficiencies and refinish mock-up area as required to produce acceptable work.

C. Subject to compliance with requirements, approved mockups may become part of the completed Work if accepted to remain by Architect and if undisturbed at time of Substantial Completion.

D. Approval of mockups does not constitute approval of deviations from the Contract Documents unless Architect specifically approves such deviations in writing.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Handle products of this Section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.10 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F (5 degrees C). Maintain this minimum temperature during and 48 hours after installation.

1.11 WARRANTY

A. Special Manufacturer Warranty: Manufacturer agrees to repair or replace components of glazed aluminum window wall that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures, including, but not limited to, excessive deflection.
      b. Noise or vibration created by wind and thermal and structural movements.
      c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
      d. Water penetration through fixed glazing and framing areas.
      e. Failure of operating components.
   2. Warranty Period: Five years from date of Substantial Completion.

B. Special Manufacturer Finish Warranty, Factory-Painted Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of baked enamel, powder coat, or organic finishes within specified warranty period.
   1. Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Delta E units when tested according to ASTM D2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   2. Warranty Period: 20 years from date of Substantial Completion.

C. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.
   1. Warranty Period: Two years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS, EXTERIOR STOREFRONT APPLICATIONS

A. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Wind loads: Provide storefront system; include anchorage, capable of withstanding wind load design pressures indicated on drawings. Design shall be based on current applicable project building codes.
2. Air Leakage - Fixed Framing: The test specimen shall be tested in accordance with ASTM E 283. Air leakage rate shall not exceed 0.06 cfm/sq. ft. at a static air pressure differential of 6.24 psf with interior seal.
3. Air Leakage - Operable Framing/Doors: The test specimen shall be tested in accordance with ASTM E 283. Air leakage rate shall not exceed 0.3 cfm/sq. ft. at a static air pressure differential of 6.24 psf with interior seal.
4. Water Resistance: The test specimen shall be tested in accordance with ASTM E 331. There shall be no leakage at a minimum static air pressure differential of 10 psf as defined in AAMA 501.
5. Uniform Load: A static air design load based on applicable project building codes. There shall be no deflection in excess of L/175 of the span of any framing member. At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.
6. Seismic: Comply with applicable codes.

B. Energy Efficiency:

1. Exterior Entrance Doors and Framed Assemblies: Shall comply with applicable project building code vertical fenestration requirements including U-factor and SHGC.

C. Windborne-Debris-Impact Resistance Performance: Shall be tested in accordance with ASTM E1886, information in ASTM E1996, and TAS 201/203.

1. Large - Missile Impact: For aluminum-framed systems located within 30 feet of grade.

2.02 PERFORMANCE REQUIREMENTS, INTERIOR STOREFRONT APPLICATIONS

A. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Air Leakage - Fixed Framing: The test specimen shall be tested in accordance with ASTM E 283. Air leakage rate shall not exceed 0.06 cfm/sq. ft. at a static air pressure differential of 6.24 psf with interior seal.
2. Air Leakage - Operable Framing/Doors: The test specimen shall be tested in accordance with ASTM E 283. Air leakage rate shall not exceed 0.3 cfm/sq. ft. at a static air pressure differential of 6.24 psf with interior seal.
3. Uniform Load: At a structural test load equal to 1.5 times the specified design load, no glass breakage or permanent set in the framing members in excess of 0.2% of their clear spans shall occur.
4. Seismic: Comply with applicable codes.

2.03 MANUFACTURERS

A. Basis of Design: Kawneer Trifab II 601T.

1. Exterior Storefront: Front Set, thermally broken.
2. Interior Storefront: Center set, non-thermally broken.
3. Configuration: As indicated on Drawings and complying with specified Performance Requirements.

B. Acceptable Manufacturers: Subject to compliance with specified requirements.

1. EFCO Corp., a Pella Company. www.efcocorp.com
2. Kawneer North/America. www.kawneer.com
3. Oldcastle Building Envelope. www.obe.com
4. YKK AP America, Inc. www.ykkap.com

2.04 STOREFRONT SYSTEMS

A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.

1. Exterior Framing Construction: Thermally broken.
   a. Includes framing in exterior entrance vestibules.
2. Interior Framing Construction: Nonthermal.
3. Glazing System: Retained mechanically with gaskets on four sides.
4. Fabrication Method: Field-fabricated stick system or pre-glazed modular.
5. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
6. Steel Reinforcement: As required by manufacturer.

B. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.

C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

2.05 ENTRANCE DOOR SYSTEMS

A. Exterior Entrance Doors: Provide thermally broken exterior entrance doors by storefront system manufacturer.

B. Exterior Entrance Doors - Basis of Design: Kawneer 350T or 500T, thermally broken.

C. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing or automatic operation.

1. For moderate to high traffic applications.

2. Door Thickness: Manufacturer standard to comply with specified requirements.
    a. Minimum 1-3/4 inch thickness.
3. Door Stile Design: As indicated on Drawings. Where not indicated, as selected by Architect.
4. Glazing Stops and Gaskets: Beveled, snap-on, extruded-aluminum stops and preformed gaskets.
    a. Provide nonremovable glazing stops on outside of door.
5. Framing Members: Manufacturer's standard extruded aluminum, minimum 0.125 inch thick and reinforced as required to support imposed loads.
    a. Fabricated with mechanical joints using heavy inserted reinforcing plates and concealed tie-rods or j-bolts.
    b. Fabricate to facilitate replacement of glass or panels, without disassembly.
6. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction. Units shall be framed solid where assembly meets rough opening.
7. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
8. Drip Cap: Provide doors with drip cap at head and bottom rail to prevent water infiltration.
9. Adjustment: Doors equipped with adjusting mechanism located in top rail near lock stile, providing for minor clearance adjustments after installation.
10. Weatherstripping: Provide factory weatherstripping at all locations. Comply with specified Performance Requirements.

D. Entrance Door Hardware:
1. Entrance Door Hardware: Provide as specified project Door Hardware specifications.
2. General: Provide entrance door hardware and entrance door hardware sets indicated in door and frame schedule for each entrance door, to comply with requirements in this Section.
    a. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products.
3. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
4. Opening-Force Requirements:
    a. Egress Doors: Not more than 15 lbf to release the latch and not more than 30 lbf to set the door in motion and not more than 15 lbf to open the door to its minimum required width.
    b. Accessible Interior Doors: Not more than 5 lbf to fully open door.

2.06 MATERIALS

A. Material Tolerances: Reference to tolerances for wall thickness and other cross-sectional dimensions of storefront members are nominal and in compliance with AA Aluminum Standards and Data.

B. Aluminum Extrusions: Alloy and temper recommended by aluminum storefront manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.070" wall thickness at any location for the main frame and complying with ASTM B 221: 6063-T6 alloy and temper.

C. Sheet and Plate: ASTM B209 (ASTM B209M).

D. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221 (ASTM B221M).

E. Structural Profiles: ASTM B308/B308M.

F. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated.

G. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

1. Sheet and Plate: ASTM B209.
2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221.
3. Extruded Structural Pipe and Tubes: ASTM B429/B429M.
4. Structural Profiles: ASTM B308/B308M.

H. Steel Reinforcement:

1. Structural Shapes, Plates, and Bars: ASTM A36/A36M.
2. Cold-Rolled Sheet and Strip: ASTM A1008/A1008M.
3. Hot-Rolled Sheet and Strip: ASTM A1011/A1011M.

I. Steel Reinforcement Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods in accordance with recommendations in SSPC-SP COM, and prepare surfaces in accordance with applicable SSPC standard.

2.07 GLAZING

A. Glazing: Comply with Section 08 8000 - Glazing.

B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

1. All elastomeric gaskets and components in contact with insulated glass units and silicone seals shall be silicone material.

2.08 ACCESSORIES

A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
2. Reinforce members as required to receive fastener threads.
3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system, fabricated from 300 series stainless steel.

B. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions or other suitable zinc coating; provide sufficient strength to withstand design pressure indicated. Three-way adjustable anchors with minimum adjustment of 1 inch (25.4 mm) that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.

1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A123/A123M or ASTM A153/A153M requirements.

C. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

D. Rigid PVC filler where backer rod installation occurs.

E. Bituminous Paint/Coating: Refer to Section 07 1115 - Protective Bituminous Paint Coating.

1. Coordinate with requirements of product/material manufacturer(s) of this Section.
2. For use as corrosion protection between dissimilar materials.
3. Apply in two coats for full coverage minimum 30 dry mil thickness, unless indicated otherwise.

2.09 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Physical and thermal isolation of glazing from framing members.
4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.

5. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.

E. Entrance Doors: Reinforce doors as required for installing entrance door hardware.

F. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

G. Framing systems shall be fabricated for maintenance access including reglazing.

H. Thresholds: At exterior doors, provide manufacturer's standard mill finish aluminum threshold with cutouts coordinated for operating hardware, with anchors and jamb clips, and not more than 1/2-inch-high, with beveled edges providing a floor level change with a slope of not more than 1:2. Comply with applicable accessibility requirements.

I. Provide weep holes and internal passages to conduct infiltrating water to exterior as well as proper end dam construction and flashing details.

2.10 FINISHES, ALUMINUM - FACTORY PAINTED/PREFINISHED

A. General:

1. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
    a. Finish of all permanently exposed areas of aluminum components shall be applied in accordance with the appropriate AAMA Voluntary Guide Specification indicated.
2. Permanently Concealed Finishes: Factory mill finish. All other permanently exposed surfaces shall be factory painted/prefinished.

B. Permanently Exposed Finishes: Factory Painted/Pre-Finished.

1. PVDF (Polyvinylidene fluoride) Superior Performance Organic Multi-Coat System: Complying with AAMA 2605; and as follows:
    a. Including at least 70 percent PVDF, FSF-free resin, and having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch (0.030 mm).
    b. Coats: Minimum two coat finish with primer as required by coating manufacturer to comply with specified requirements.
    c. Finish Type: Arkema Group, Kynar 500, Sherwin Williams Fluropon, PPG Duranar, or Solvay Solexis, Inc., Hylar 5000 resin (Polyvinylidene fluoride, PVDF), formulated by a licensed manufacturer and applied by manufacturer's approved applicator to meet AAMA 2605.
2. Color: As selected by Architect from manufacturer full range.

C. Touch-Up Materials: As recommended by finish manufacturer for field application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Verify rough opening dimensions, levelness of sill substrate and operational clearances.

1. Masonry Surfaces: Visibly dry and free of excess mortar, sand, and other construction debris.
2. Metal Surfaces: Dry; clean; free of grease, oil, dirt, rust, corrosion, and welding slag; without sharp edges or offsets at joints.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 INSTALLATION

A. General:

1. Comply with manufacturer's written instructions.
2. Install aluminum-framed storefront system level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall and other adjacent construction.
3. Do not install damaged components.
4. Fit joints to produce hairline joints free of burrs and distortion.
5. Rigidly secure nonmovement joints.
6. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
7. Seal perimeter and other joints watertight unless otherwise indicated.
8. Seal perimeter and other joints airtight unless otherwise indicated.

B. Sealants:

1. Install continuous internal sealants in locations recommended and required by storefront assembly manufacturer.
2. Install sealants as required to maintain internal and external assembly dry line throughout the rough opening and storefront assembly. Sealant installation shall be continuous in each location in order to provide watertight condition. Provide minimum three sealant locations within rough opening as follow, listed from interior to exterior.
3. Interior Air and Water Sealant Bead: Applied between the interior edge of the frame and in direct contact with the air and water barrier membrane flashing at the termination of the rough opening. Interior sealant joints shall be applied prior to interior finishes.

a. Interior aesthetic sealant bead inboard of the interior air and water sealant bead: As indicated on Drawings at transitions between interior finishes for aesthetic purposes only. Coordinate with individual finish material specification requirements and the requirements of Section 07 9200 - Joint Sealants.

4. Primary Air and Water Sealant Bead: The primary backer rod and sealant shall be applied between the outside frame and in direct contact with the membrane flashing in the rough opening.

5. Exterior, Secondary Water Barrier Sealant Bead: The exterior secondary sealant beach shall be installed between the storefront assembly and the building exterior wall cladding system finishes. This layer of sealant protects bulk water from getting to the primary seal. Do not block storefront sill assemblies with sealant.

6. All sealant installations shall be tooled for smooth transition and in shape to drain water to lower drainage points in assembly.

C. Metal Protection:

1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with primer, applying sealant or tape, or installing nonconductive spacers as recommended by manufacturer for this purpose.

2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

D. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum storefront to exterior.

E. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.

1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.

2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.03 INSTALLATION OF GLAZING

A. Comply with manufacturer's written instructions.

B. Install glazing as specified in Section 08 8000 - Glazing.

3.04 INSTALLATION TOLERANCES

A. Install components plumb and true in alignment with established lines and grades.

B. Maintain the following minimum tolerances. Comply with system manufacturer requirements where more stringent.

1. Line: Plus/minus 2 mm in any one-story height, or structural bay width: +/- 4 mm overall.

2. Level: Plus/minus 2 mm in any one structural bay and plus/minus 4 mm overall.
3. Plumb: Plus/minus 2 mm in any one-story height, and plus/minus 4 mm overall
4. Pane: Plus/minus 2 mm in any one-story height or structural bay width and plus/minus 4 mm overall.

3.05 ADJUSTING, CLEANING, AND PROTECTION

A. Clean aluminum surfaces immediately after installing aluminum framed storefronts. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

B. Clean glass immediately after installation. Comply with glass manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.

C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

D. Protect from damage through date of Substantial Completion.

E. Clean and repair damage at date of Substantial Completion to provide as new appearance of materials and finishes. Where as new appearance cannot be provided, replace with new at the sole expense of the Contractor.

3.06 FIELD QUALITY CONTROL

A. Third Party Inspector: Contractor shall engage a qualified testing agency to inspect substrate conditions, surface preparation, material application, protection, and components, and to furnish reports to Architect and materials manufacturer.
   1. Additional testing requirements shall be as recommended by Third Party Inspector and as approved by Architect.

B. Exterior Field Quality-Control Testing: Perform the following tests on storefronts.
   1. Testing procedures may be modified as recommended by building envelope consultant or testing agency. Deviations from testing procedures are acceptable only when approved by Architect.
   2. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
   3. Provide testing in accordance with AAMA 503.
      a. Air Infiltration: ASTM E783 at 1.5 times the rate specified for laboratory testing in "Performance Requirements" Article.
      b. Water Penetration: ASTM E1105 at 2/3 of the uniform and cyclic static-air-pressure differential rate specified for laboratory testing in "Performance Requirements" Article, but not less than 6.24 psf.

4. Perform each test at each building on project.
    a. Test minimum one storefront of each type per elevation. Storefront type is defined by the model and adjacent cladding system. Different cladding systems equal different storefront types. Two cladding systems adjacent to storefronts on a building elevation indicates a requirement for minimum one test per storefront type per elevation.
    b. Test minimum two framed units per single story building.
    c. Test minimum four framed units per multi-story building.
    d. At multistory buildings provide multiple tests at 10%, 20% and 90% completion.
    e. Conduct tests after perimeter sealants have cured.

C. Aluminum-framed storefronts will be considered defective if they do not pass tests and inspections. Failed test locations shall be repaired and retested until performance results meet specified requirements. All costs and coordination for additional testing shall be the responsibility of the Contractor and at no cost to the Owner.
    1. Units that fail water tests shall be have deficiencies corrected, including replacement of storefront assembly as needed, and retested.
    2. Failed assemblies shall result in testing of two additional assemblies.
    3. Cost for retest of the failed unit and additional assemblies shall be the sole responsibility of the responsible party.
    4. Corrections required at failed assemblies shall be corrected at all other storefront units where similar configurations occur.

D. Prepare and submit test and inspection reports.

END OF SECTION

SECTION 08 5700

EXTERIOR SLIDING ALUMINUM WINDOWS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Exterior sliding, thermally broken, aluminum window units.

1.03 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

B. Attendees shall include contractor, window installer, manufacturer technical representative, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.04 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product data for each type of aluminum window specified, including standard construction details, dimensions of individual components, profiles, finishes, and accessories.

C. Samples for Selection: Provide manufacturer standard color selection charts for all permanently exposed components.

D. Samples for Verification: When requested by Architect, provide full or partial size samples of window components illustrating glazing system, quality of construction and finish, and color selections.

E. Shop Drawings: For each type of window specified, including ¼-inch scale wall elevations, typical unit elevations at ¾-inch scale details, full size details of typical composite members and the following:

1. Panning Details
2. Flashing and drainage details.
3. Mullion details, including reinforcement and stiffeners.
4. Joinery details.
5. Indicate compliance with Performance Requirements article of this Section.

1.05 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements.

C. Special Manufacturer Finish Warranty: Executed warranty meeting specified requirements.

D. Maintenance Data: Provide manufacturer parts lists, operation, and maintenance instructions for the materials of this Section.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least five years of documented experience.

B. Installer Qualifications: Company specializing in performing work of type specified and with at least five years of documented experience and approved by manufacturer.

C. All window units shall be manufactured by a single source.

D. All windows in any one project must be by the same manufacturer and with comparable frame depth, profile, glazing bite, and installation requirements. Manufacturer must provide a window system that can incorporate all window configurations used on the project.

E. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.

1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.07 DELIVERY, STORAGE AND HANDLING

A. Transportation and Handling: Transport products by methods to avoid product damage, deliver in undamaged condition in manufacturer’s unopened containers or packaging. Provide equipment and personnel to handle products by method to prevent soiling or damage. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.

B. Storage and Protection: Store products in accordance with manufacturer’s instructions, with seals and labels intact and legible. Store sensitive products in weather-tight enclosures; maintain with temperature and humidity ranges required by manufacturer’s instruction.

1.08 WARRANTIES

A. Special Manufacturer Finish Warranty, Factory-Painted Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of

deterioration of baked enamel, powder coat, or organic finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:
    a. Color fading more than 5 Delta E units when tested according to ASTM D2244.
    b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
    c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Warranty Period: 20 years from date of Substantial Completion.

B. Special Manufacturer Aluminum Window Warranty:
1. Products: Submit a written warranty, executed by the window manufacturer, for the following:
    a. Framing components: A period of (1) year from the date of manufacture, against defective materials and workmanship, including substantial non-compliance with applicable specification requirements and industry standards, which results in premature failure of the windows or parts, outside of normal wear.
    b. Insulated glass units: A period of (10) years from the date of manufacture, against insulated glass seal failure unrelated to glass breakage.
    c. In the event windows or components are found defective, manufacturer will repair or provide replacements without charge at manufacturer's option.
    d. Warranty for all components must be direct from the manufacturer (non-pass through) and non- prorated for the entire term. Warranty must be assignable to the non-residential owner, and transferable to subsequent owners through its length.

C. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.
1. In the event that installation of windows or components is found to be defective, installer will repair or provide replacements without charge at the installer's option.
2. Warranty Period: Two years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: Products by Kawneer. www.kawneer.us
1. Selection: Horizontal sliding, thermally broken, 8400TL Thermal Windows.

2.02 PERFORMANCE REQUIREMENTS

A. General Performance: Aluminum-framed window system shall withstand the effects of the following performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Provide aluminum windows of performance indicated that comply with AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS).
    a. Performance Class and Grade: HS-AW40 - 148" x 79" (3759 x 2007 mm) (OXO).
    b. Performance Class and Grade: HS-AW70 - 99" x 79" (2515 x 2007 mm) (XX).
    c. Performance Class and Grade: HS-AW70 - 148" x 79" (3759 x 2007 mm) (XOX).

B. Air Leakage: The test specimen shall be tested in accordance with ASTM E 283. The air leakage rate shall not exceed 0.30 cfm/ft2 (1.5 L/s·m2) at a static air pressure differential of 6.2 psf (300 PA).

C. Water Resistance: The test specimen shall be tested in accordance with ASTM E 331 and ASTM E 547. There shall be no leakage as defined in the test method at a static air pressure differential of 10 psf (479 Pa).

D. Uniform Load Deflection: A minimum static air pressure difference of 70 psf (3352 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. There shall be no deflection in excess of L/175 of the span of any framing member.

E. Uniform Load Structural Test: A minimum static air pressure difference of 105 psf (5027 Pa) shall be applied in the positive and negative direction in accordance with ASTM E 330. The unit shall be evaluated after each load.

F. Component Testing: Window components shall be tested in accordance with procedures described in AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS).

G. Energy Efficiency: Shall comply with applicable project building code vertical fenestration requirements including U-factor and SHGC.

H. Windborne-Debris-Impact-Resistance Performance: Shall be tested in accordance with ASTM E 1886 and information in ASTM E 1996 and TAS 201/203.
    1. Large – Missile Impact: For aluminum-framed systems located within 30 feet of grade.

I. Forced Entry Resistance: All windows shall conform to ASTM F588, Grade 10.

J. Thermal Barrier Tests: Testing shall be in general accordance with AAMA 505 Dry Shrinkage and Composite Thermal Cycling test procedure, AAMA TIR-A8, Structural Performance of Composite Thermal Barrier systems.

2.03 MATERIALS

A. Aluminum Extrusions: Alloy and temper recommended by aluminum window manufacturer for strength, corrosion resistance, and application of required finish and not less than 0.070" (1.78 mm) wall thickness at any location for the main frame and sash members.

B. Thermal Barrier: The thermal barrier shall be Kawneer IsoLock with a nominal 3/8" separation consisting of a two-part, chemically curing high density polyurethane which is mechanically and adhesively bonded to the aluminum.

C. Fasteners: Aluminum, nonmagnetic stainless steel or other materials to be non-corrosive and compatible with aluminum window members, trim, hardware, anchors, and other components.

D. Anchors, Clips, and Accessories: Aluminum, nonmagnetic stainless steel, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.

E. Reinforcing Members: Aluminum, nonmagnetic stainless steel, or nickel/chrome-plated steel complying with ASTM B 456 for Type SC 3 severe service conditions, or zinc-coated steel or iron complying with ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.

F. Sealant: For sealants required within fabricated windows, provide window manufacturer's standard, permanently elastic, non-shrinking, and non-migrating type recommended by sealant manufacturer for joint size and movement.

2.04 GLASS MATERIALS

A. Glass and Glazing Materials: Refer to Section 08 8000 - Glazing, for glass units and glazing requirements applicable to glazed aluminum window units.

B. Glazing System: Glazing method shall be a wet/dry type in accordance with manufacturer’s standards. Exterior glazing shall be silicone back bedding sealant. Interior glazing shall be snap-in type glazing beads with an interior gasket in accordance with AAMA 702 or ASTM C864.

2.05 HARDWARE

A. General: Provide manufacturer's standard hardware fabricated from aluminum, stainless steel, or other corrosion-resistant material compatible with aluminum; designed to smoothly operate, tightly close, and securely lock aluminum windows, and sized to accommodate sash weight and dimensions.

B. Horizontal Sliding Window Hardware: As selected by Architect from the following.

1. Continuous Integral Pulls
2. Stainless Steel Ball Bearing Rollers
3. Stainless Steel Roller Track
4. Plunger Lock

C. Exterior Panning and Interior Trims: Extruded aluminum, 6063-T6 alloy and temper, extruded to profiles and details indicated. Seal exterior joints with manufacturer's standard sealant to assure water-tight joints.

1. Exterior Panning and Trims: All panning profiles shall be a minimum thickness of 0.062" (1.57 mm) to match the profiles as shown the drawings. Any profile variations shall be submitted to the architect and/or owner for approval 10 days prior to bid date. All panning shall be factory fabricated for field assembly. All corner joinery shall be factory

cut. Joinery at the sill shall be coped and butt-type construction. All preparations for assembly shall be completed by the window manufacturer. Upon assembly, panning frame joints shall be back-sealed to prevent moisture penetration.

2. Interior Trims: The interior face trim minimum wall thickness shall be 0.062" (1.57 mm). The face trim shall snap-fit onto concealed mounting clip. Exposed fasteners shall not be accepted. The mounting clip shall be extruded aluminum of 6063-T6 alloy and temper. The minimum wall thickness shall be 0.062" (1.57 mm). The trim clips shall be provided in 4" (101.6 mm) lengths and spaced a maximum of 18" (457.2 mm) center to center.

2.06 FABRICATION

A. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:

1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fit joints; make joints flush, hairline and weatherproof.
3. Means to drain water passing joints, condensation within framing members, and moisture migrating within the system to exterior.
4. Physical and thermal isolation of glazing from framing members.
5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
6. Provisions for field replacement of glazing.
7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

B. Window Frame Joinery: Screw-spline, factory sealed frame and vent corner joints.

C. Fabricate aluminum windows in sizes indicated. Include a complete system for assembling components and anchoring windows.

D. Fabricate aluminum windows that are re-glazable without dismantling sash or framing.

E. Mullions: Provide mullions and cover plates as shown, matching window units, complete with anchors for support to structure and installation of window units. Allow for erection tolerances and provide for movement of window units due to thermal expansion and building deflections, as indicated. Provide mullions and cover plates capable of withstanding design loads of window units.

F. Sub frames: Provide sub frames with anchors for window units as shown, of profile and dimensions indicated but not less than 0.093" (2.4 mm) thick extruded aluminum. Miter or cope corners, and join with concealed mechanical joint fasteners. Finish to match window units. Provide sub frames capable of withstanding design loads of window units.

G. Factory-Glazed Fabrication: Glaze aluminum windows in the factory where practical and possible for applications indicated. Comply with requirements in Division 08 Section “Glazing” and with AAMA/WDMA/CSA 101/I.S.2/A440-08 (NAFS).

H. Glazing Stops: Provide snap-on glazing stops coordinated with Division 08 Section “Glazing” and glazing system indicated. Provide glazing stops to match frame.

2.07 FINISHES, ALUMINUM - FACTORY PAINTED/PREFINISHED

A. Finish of all permanently exposed areas of aluminum components shall be applied in accordance with the appropriate AAMA Voluntary Guide Specification indicated.

B. Permanently Concealed Finishes: Factory mill finish. All other permanently exposed surfaces shall be factory painted/prefinished.

C. Factory Painted/Pre-Finished Finish Options: Provide one of the following.

1. FEVE Superior Performance Organic Powder Coating: Conforming to AAMA 2605 and as follows:

a. Fluoroethylene vinyl ether (FEVE): Superior performance IFS 100% FEVE resin based fluoropolymer powder coated finish. Zero VOC formulation.

b. Coats: Minimum one coat finish over aluminum with primer as required by coating manufacturer to comply with specified requirements

c. Scratch resistance shall meet or exceed a pencil test of H in accordance with (ASTM D3363), “Standard Test Method for Film Hardness by Pencil Test”.

d. Abrasion resistance shall meet or exceed a Taber abrasion test of 1000 rotations in accordance with (ASTM D4060), “Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser”.

2. PVDF (Polyvinylidene fluoride) Superior Performance Organic Multi-Coat System: Complying with AAMA 2605; and as follows:

a. Including at least 70 percent PVDF, FSF-free resin, and having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch (0.030 mm).

b. Coats: Minimum two coat finish with primer as required by coating manufacturer to comply with specified requirements.

c. Finish Type: Arkema Group, Kynar 500, Sherwin Williams Fluropon, PPG Duranar, or Solvay Solexis, Inc., Hylar 5000 resin (Polyvinylidene fluoride, PVDF), formulated by a licensed manufacturer and applied by manufacturer's approved applicator to meet AAMA 2605.

3. Color: As selected by Architect from manufacturer full range.

PART 3 EXECUTION

3.01 EXAMINATION

A. Site Verification of Conditions:

1. Verify that building substrates permit installation of windows according to the manufacturer's instructions, approved shop drawings, calculations and contract documents.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 INSTALLATION

A. Erection of Aluminum Windows:

1. Install windows with skilled tradesmen in exact accordance with approved Shop Drawings, Installation Instructions, Specifications, and in accordance with (AAMA 101/I.S.2./ A440).
2. Windows must be installed plumb, square, and level for proper weathering and operation. Jambs must not be “sprung”, bowed, or warped during installation.
3. Any uncoated aluminum components of Aluminum Window shall be insulated from direct contact with steel, masonry, concrete, or other dissimilar metals by bituminous paint, zinc chromate primer, nonconductive shims, or other suitable insulating materials.

3.03 FIELD QUALITY CONTROL

A. Testing Agency: Contractor shall engage a qualified testing agency to perform tests, inspections, and written reports in accordance with AAMA standards. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.

B. Field Quality-Control Testing: Perform the following test on aluminum window assemblies.

1. Testing procedures may be modified as recommended by building envelope consultant or testing agency. Deviations from testing procedures are acceptable only when approved by Architect.
2. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
3. Testing Methodology: Testing Standard shall be per AAMA 502 including reference to ASTM E 783 for Air Leakage Test and ASTM E 1105 for Water Penetration Test.
    a. Air Leakage Test: Conduct test in accordance with ASTM E 783 at a minimum uniform static test pressure of 6.2 psf (300 Pa). The maximum allowable rates of air leakage for field testing shall not exceed 1.5 times the project specifications.
    b. Water Infiltration Test: Water penetration resistance tests shall be conducted in accordance with ASTM E 1105 at a static test pressure equal to 2/3 the specified water test pressure.
4. Test Reports: Shall be prepared according to AAMA 502.
5. Perform each test at each building on project.
    a. Test minimum one of each type per elevation. Type is defined by the model and adjacent cladding system. Different cladding systems equal different types. Two

cladding systems adjacent to curtainwall installations on a building elevation indicates a requirement for minimum one test per type per elevation.

b. Conduct tests after perimeter sealants have cured.

C. Window assemblies will be considered defective if they do not pass tests and inspections. Failed test locations shall be repaired and retested until performance results meet specified requirements. All costs and coordination for additional testing shall be the responsibility of the Contractor and at no cost to the Owner.

D. Prepare and submit test and inspection reports.

3.04 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust operating sashes, screens, hardware, and accessories for a tight fit at contact points and weather stripping for smooth operation and weather tight closure. Lubricate hardware and moving parts.

B. Clean aluminum surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

C. Clean glass immediately after installing windows. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels, and clean surfaces.

D. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

E. Protect window surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor window surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written recommendations.

END OF SECTION

SECTION 08 7100

DOOR HARDWARE

PART 1 GENERAL

1.01 CONDITIONS

A. Conditions of the contract (General Supplementary Conditions) and Division 01 - General Requirements, govern the work of this section.

B. This section includes all material, and related service necessary to furnish all finish hardware indicated on the drawings or specified herein.

C. Furnish UL listed hardware for all labeled and 20 min. openings in conformance with the requirements for the class of opening scheduled. Underwriters' requirements shall have precedence over specification where conflicts exist.

D. All work shall be in accordance with all applicable state and local building codes. Code requirements shall have precedence over this specification where conflicts exist.

1.02 WORK INCLUDED

A. This section includes the following:

1. Furnish door hardware (for hollow metal, wood and aluminum doors) specified herein, listed in the hardware schedule, and/or required by the drawings.

2. Cylinders for Aluminum Doors

3. Thresholds and Weather-stripping (Aluminum frame seals to be provided by aluminum door supplier)

4. Electro-Mechanical Devices

5. Access Control components and or systems specified within this section.

a. Where items of hardware are not definitely or correctly specified and is required for the intended service, such omission, error or other discrepancy should be directed to the Architect prior to the bid date for clarification by addendum. Otherwise furnish such items in the type and quantity established by this specification for the appropriate service intended.

1.03 RELATED WORK IN OTHER SECTIONS

A. This section includes coordination with related work in the following sections:

1. Division 06 Section "Finish Carpentry".

2. Division 06 Section "Cabinet Hardware"

3. Division 08 Section "Hollow Metal Doors and Frames".

4. Division 08 Section "Wood Doors"

5. Division 08 Section “Storm Doors”

6. Division 08 Section "Aluminum Entrances and Storefronts"

7. Division 26 Sections “Electrical”

8. Division 28 Sections "Electronic Safety and Security".

1.04 REFERENCES

A. Publications of agencies and organizations listed below form a part of this specification section to the extent referenced DHI – Installation Guide for Doors and Hardware (2020).

1. NFPA 80 - Standards for Fire Doors and Windows.

2. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures.

3. UL - Building Material Directory.

4. DHI - Door and Hardware Institute

5. WHI - Warnock Hersey

6. BHMA - Builders Hardware Manufacturers Association

7. ANSI – American National Standards Institute

8. IBC - International Building Code (as adopted and amended by local building code)

1.05 SUBMITTALS

A. Within ten days after award of contract, submit detailed hardware schedule in quantities as required by Division 01 - General Requirements.

B. Schedule format shall be consistent with recommendations for a vertical format as set forth in the Door & Hardware Institute's (DHI) publication "Sequence and Format for

the Hardware Schedule". Hardware sets shall be consolidated to group multiple door openings which share similar hardware requirements. Schedule shall include the following information:

1. Door number, location, size, handing, and rating.
2. Door and frame material, handing.
3. Degree of swing.
4. Manufacturer
5. Product name and catalog number
6. Function, type and style
7. Size and finish of each item
8. Mounting heights
9. Explanation of abbreviations, symbols, etc.

C. Numerical door index, indicating the hardware set/ group number for each door.

1. When universal type door closers are to be provided, the schedule shall indicate the application method to be used for installation at each door: (regular arm, parallel arm, or top jamb).
2. The schedule will be prepared under the direct supervision of a certified Architectural Hardware Consultant (AHC), or certified Door Hardware Consultant (DHC) employed by the hardware distributor. The hardware schedule shall be signed and embossed or stamped with the DHI certification seal of the supervising AHC or DHC. The supervising AHC or DHC shall attend any meetings related to the project when requested by the architect.
3. Check the specified hardware for suitability and adaptability to the details and surrounding conditions.
4. Review drawings from related trades as required to verify compatibility with specified hardware. Indicate unsuitable or in compatible items, and proposed substitutions in the hardware schedule.
5. Provide documentation for all hardware to be furnished on labeled fire doors indicating compliance with positive pressure fire testing UL 10C.
6. Furnish manufacturers' catalog data for each item of hardware in quantities as required by Division 01 - General Requirements.

7. Submit a sample of each type of hardware requested by the architect. Samples shall be of the same finish, style, and function as specified herein. Tag each sample with its permanent location so that it may be used in the final work.

8. Furnish with first submittal, a list of required lead times for all hardware items.

9. After final approved schedule is returned, transmit corrected copies for distribution and field use in quantities as required by Division 01 - General Requirements.

10. Furnish approved hardware schedules, template lists, and pertinent templates as requested by related trades.

11. Furnish necessary diagrams, schematics, voltage and amperage requirements for all electro-mechanical devices or systems as required by related trades. Wiring diagrams shall be opening specific and include both a riser diagram and point to point diagram showing all wiring terminations.

12. After receipt of approved hardware schedule, Hardware supplier shall initiate a meeting including the owner's representative to determine keying requirements. Upon completion of initial key meeting, hardware supplier shall prepare a proposed key schedule with symbols and abbreviations as set forth in the door and hardware institute's publication "Keying Procedures, Systems, and Nomenclature". Submit copies of owner approved key schedule for review and field use in quantities as required by Division 01 - General Requirements. Wiring diagrams shall be included in final submittals transmitted for distribution of field use.

1.06 QUALITY ASSURANCE

A. Manufacturers and model numbers listed are to establish a standard of function and quality. Similar items by approved manufacturers that are equal in design, function, and quality, may be considered for prior approval of the architect, provided the required data and physical samples are submitted for approval as set forth in Division 01 - General Requirements.

B. Where indicated in this specification, products shall be independently certified by ANSI for compliance with relevant ANSI/BHMA standards A156.1 - A156.36 – Standards for Hardware and Specialties. All products shall meet or exceed certification requirements for the respective grade indicated within this specification. Supplier shall provide evidence of certification when requested by the architect.

C. Obtain each type of hardware (hinges, latch & locksets, exit devices, closers, etc.) from a single manufacturer, although several may be indicated as offering products complying with requirements.

D. Electrical drawings and electrical specifications are based on the specific electrified hardware components specified in hardware sets. When electronic hardware

components other than those indicated in hardware sets are provided, the supplier shall be responsible for all costs incurred by the design team and their consultants to review and revise electrical drawings and electrical specifications. Supplier shall also be responsible for any additional costs associated with required changes in related equipment, materials, installation, or final hook up to ensure the system will operate and function as indicated in the construction documents, including hardware set operational / functional descriptions.

E. All hardware items shall be manufactured no earlier than 6 months prior to delivery to site.

F. Hardware supplier shall be factory trained and certified by the manufacture to provide and support all computer managed locks and system components.

G. Installation of hardware shall be installed or directly supervised and inspected by a skilled installer certified by the manufacturer of locksets, door closers, and exit devices used on the project, or with not less than 3 years' experience in successful completion of projects similar in size and scope.

H. Provide hardware for all labeled fire doors, which complies with positive pressure fire testing UL 10C.

I. Comply with all applicable provisions of the standards referenced within section 1.4 of this specification.

J. Hardware supplier shall participate when reasonably requested to meet with the contractor and or architect to inspect any claim for incorrect or non-functioning materials; following such inspection, the hardware supplier shall provide a written statement documenting the cause and proposed remedy of any unresolved items.

1.07 DELIVERY, STORAGE AND HANDLING

A. Hardware supplier shall deliver hardware to the job site unless otherwise specified.

B. All hardware shall be delivered in manufacturers' original cartons and shall be clearly marked with set and door number.

C. Coordinate with contractor prior to hardware delivery and recommend secure storage and protection against loss and damage at job site.

D. Contractor shall receive all hardware and provide secure and proper protection of all hardware items to avoid delays caused by lost or damaged hardware. Contractor shall

report shortages to the Architect and hardware supplier immediately after receipt of material at the job site.

D. Coordinate with related trades under the direction of the contractor for delivery of hardware items necessary for factory installation.

1.08 PRE-INSTALLATION MEETING

A. Schedule a hardware pre-installation meeting on site to review and discuss required door operating clearances and the installation of continuous hinges, locksets, door closers, exit devices, overhead stops, and electromechanical door hardware.

B. Meeting attendees shall be notified 7 days in advance and shall include: Architect, Contractor, Door Hardware Installers (including low voltage hardware), Manufacturers representatives for above hardware items, and any other effected subcontractors or suppliers.

C. All attendees shall be prepared to distribute installation manuals, hardware schedules, templates, and physical hardware samples.

1.09 WARRANTY

A. All hardware items shall be warranted against defects in material and workmanship as set forth in Division 01 - General Requirements.

1. Repair, replace, or otherwise correct deficient materials and workmanship without additional cost to owner

PART 2 PRODUCTS

2.01 FASTENERS

A. All exposed fasteners shall be Phillips head or as otherwise specified and shall match the finish of the adjacent hardware. All fasteners ex-posed to the weather shall be non-ferrous or stainless steel. Furnish correct fasteners to accommodate surrounding conditions.

B. Coordinate required reinforcements for doors and frames. Seek approval of the architect prior to furnishing through-bolts. Furnish through-bolts as required for materials not readily reinforced.

2.02 BUTT HINGES

A. Acceptable manufacturers and respective catalog numbers:

	Ives	Stanley	Hager	McKinney
1. Standard Weight, Plain Bearing	5PB1	F179	****	T2714
2. Standard Weight, Ball Bearing	5BB1	BB179	BB1279	TB2714
3. Standard Weight, Ball Bearing, Non-Ferrous	5BB1	FBB191	BB1191	TB2314
4. Heavy Weight, Ball Bearing	5BB1HW	FBB168	BB1168	T4B3786
5. Heavy Weight, Ball Bearing, Non-Ferrous	5BB1HW	FBB199	BB1199	T4B3386

B . Hinges shall be independently certified by ANSI for compliance with ANSI A156.1 (2006). Hinges shall meet or exceed the following ANSI grade requirements as indicated below:

1. Standard Weight, Plain Bearing Hinges: Grade 3

2. Standard Weight, 2 Ball Bearing Hinges: Grade 2

3. Heavy Weight, 4 Ball Bearing Hinges: Grade 1

C. Unless otherwise specified, furnish the following hinge quantities for each door leaf.

1. 3 hinges for doors up to 90 inches.

2. 1 additional hinge for every 30 inches on doors over 90 inches.

3. 4 hinges for Dutch door applications.

D. Unless otherwise specified, top and bottom hinges shall be located as specified in Division 08 Section "Hollow Metal Doors and Frames". Intermediate hinges shall be located equidistant from others.

E. Unless otherwise specified, furnish hinge weight and type as follows:

1. Standard weight: plain bearing hinge 5PB1 or ball bearing hinge 5BB1 for interior openings through 36 inches wide without a door closer.

2. Standard weight: ball bearing hinge 5BB1 for interior opening over 36 through 40 inches wide without a door closer, and for interior openings through 40 inches wide with a door closer.

3. Heavyweight: 4 ball bearing hinge 5BB1HW for interior openings over 40 inches wide, and for all vestibule doors.

4. Heavyweight: 4 ball bearing hinge 5BB1HWss for exterior openings unless otherwise listed in groups.

5. Heavyweight: 4 ball bearing hinge 5BB1HWss 5” for all exterior doors or 4 ball bearing hinge 5BB1HW 5” for interior doors, that have an automatic operator.

F. At existing frames receiving new hinges, match existing hinge size and weight.

G. Unless otherwise specified, furnish brass, bronze, or stainless-steel base metal for hinges at exterior doors. Unless otherwise specified, furnish steel base metal for hinges at interior doors.

H. Furnish stainless steel base metal for hinges at showers, pools, and wash bay doors.

I. Unless otherwise specified, furnish hinges in the following sizes:
1. 5" x 5" 2-1/4" thick doors
2. 4-1/2" x 4-1/2" 1-3/4" thick doors
3. 3-1/2" x 3-1/2" 1-3/8" thick doors

J. Furnish hinges with width to accommodate trim and allow for 180-degree swing.

K. Unless otherwise specified, furnish hinges with flat button tips with non-rising pins at interior doors, non-removable loose pins (NRP) at exterior, and out-swinging lockable interior doors.

L. Unless otherwise specified, furnish all hinges to template standards.

2.03 CONTINUOUS PIN AND BARREL HINGES

A. Acceptable manufacturers and respective catalog numbers:

	Ives	Markar	Stanley
1. Edge Mount Pin & Barrel Stainless Steel Continuous Hinge	700 Series	300 Series	650 Series

B. Hinges shall be independently certified by ANSI for compliance with ANSI A156.26, Grade 1 (2012).

C. Continuous hinges shall be full height pin and barrel type hinge providing full height door support up to 600 lbs. Edge mount (unless noted otherwise).

D. Construct hinges of heavy-duty 14-gauge material. The stainless internal pin shall have a diameter of 0.25 and the exterior barrel diameter of 0.438.

E. Hinge shall be non-handed with symmetrical template hole pattern and factory drilled. Hinge must accept a minimum of 21 fasteners on the door and 21 fasteners on the frame.

F. Each knuckle to be 2 inches, including split nylon bearing at each separation for quiet, smooth, self-lubricating operation.

G. Hinge to be able to carry Warnock Hersey Int. or UL for fire rated doors and frames up to 3 hours.

H. Provide machine screws for doors which have been reinforced to accept machine screws.

I. Note: Fire label for doors and frames should be placed on the header and top rail of fire rated doors and frames.

2.04 POWER TRANSFERS

A. Acceptable manufacturers and respective catalog numbers:

	Von Duprin	ASSA
1. Concealed Two Wire	EPT-2	CEPT-10
2. Concealed Ten Wire	EPT-10	CEPT-10

B. Concealed power transfers shall be concealed in the door and frame when the door is closed.

C. Concealed power transfers shall have a steel tube to protect wires from being cut.

D. Concealed power transfers with spring tubes shall be rejected.

E. Concealed power transfers shall be supplied with a mud box to house all terminations.

2.05 FLUSH BOLTS AND DUST PROOF STRIKES

A. Acceptable manufacturers and respective catalog numbers:

	Ives	Trimco	Hager
1. Dust Proof Strike	DP2	3910	280X
2. Constant Latching Bolt (Metal Door)	FB51P	3820	293D
3. Constant Latching Bolt (Wood Door)	FB61P	3825L	294D

B. Unless otherwise specified, provide 12" rods for manual flush bolts for door 7'6" or less, 24" top rods for doors over 7'6" to 8'6".

C. Unless otherwise specified, provide doors over 8'6" with automatic top bolts.

D. Provide automatic flush bolts where required to maintain fire door listing and or egress requirements on pairs of doors.

E. All flush-bolt applications shall be UL listed to be installed with top flush-bolt only. Provide auxiliary fire bolt as required for fire rated openings where less bottom bolt has been specified.

F. Provide all bottom flush bolts with non-locking dust proof strikes.

2.06 EXIT DEVICES

A. Acceptable manufacturers and respective catalog numbers:

	Von Duprin	Precision	Detex
1. Wide Stile, Push Pad	99 Series	2000 Series	Advantex (Wide Stile)
2. Wide Stile, Electric Latch Retraction	QEL 99 Series	MLR-2000 Series	Advante-ER x (Wide Stile)
3. Lever Trim	996 Series	3900 Series	“D/DM” Trim
4. Pull Trim	990 Series	1700A Series	“C” Trim

B. Exit devices shall be independently certified by ANSI for compliance with ANSI A156.3, Grade 1 (2008).

C. Obtain exit devices from a single manufacturer, although several may be indicated as offering products complying with requirements.

D. All exit devices shall be equipped with a sound-dampening feature to reduce touch pad return noise.

E. Quiet Electric Latch Retraction shall be accomplished using a motor driven assembly, and shall incorporate the following features:

1. Motor shall retract both the push pad assembly and latchbolt.

2. Automatic calibration of latch throw and pull.

3. Built-in time delay.

4. On-board installation and troubleshooting diagnostics built into power supply and device.

5. Retry mode if device does not pull on the first try.

F. On full glass doors there shall be no exposed fasteners on the back of the mechanism visible through the glass.

G. All exit devices shall be provided with flush end caps to reduce potential damage from impact.

H. All exit devices shall be provided with dead-locking latch bolts to ensure security.

I. All exit devices shall be U.L. listed for accident hazard. Exit device for use on fire doors shall also be U.L. listed for fire exit hardware.

J. Provide optional strikes, special length rods, and adapter plates to accommodate door and frame conditions. Provide narrow style series devices in lieu of wide stile series devices where optional strikes will not accommodate door and frame conditions.

K. Coordinate with related trades to ensure adequate clearance and reinforcement is provided in doors and frames. Provide thru bolts as required.

L. Refer to hardware groups for exit device applications utilizing the option of: "less bottom rod and floor strike" (LBR).

M. All exit devices shall be provided with optional trim designs to match other lever and pull designs used on the project.

N. Unless specific exit device dogging options are noted within hardware sets, provide dogging options as follows:

1. Fire Rated devices: Dogging not permitted.

2. Non-Rated Exit Only functions not equipped with outside trim or pull: Less Dogging.

3. Non-Rated Classroom functions: Less Dogging.

4. Non-Rated devices utilizing electric latch retraction or electrified outside trim: Less Dogging.

5. All Other Non-Rated devices: Cylinder Dogging utilizing interchangeable core cylinders. Cylinder keyway shall match locksets furnished on this project.

O. Provide glass bead kits as required to accommodate door conditions. Screws shall not be visible through full glass doors.

P. Where specified, provide compatible keyed mullions with cylinder for pairs of doors.

Q. Provide Von Duprin #154 or equivalent mullion/frame stabilizers at the following application(s):

1. Lockable exterior or vestibule paired openings with a fixed or removable hollow metal or aluminum mullion.

2. Lockable exterior or vestibule single doors in aluminum frames.

2.07 LOCKS AND LATCHES

A. Acceptable manufacturers and respective catalog numbers:

	Schlage	No Substitution
1. Grade 1 Cylindrical	ND Series SPA	

B. Bored locks shall be independently certified by ANSI for compliance with ANSI A156.2 (2011). Mortise locks shall be independently certified by ANSI for compliance with ANSI A156.13 (2012).

C. Unless otherwise specified, all locks and latches to have:

1. 2-3/4" Backset

2. 1/2" minimum throw latchbolt

3. 1" throw deadbolt

4. 6 pin cylinders

5. ANSI A115.2 strikes

D. Provide guarded latch bolts for all locksets, and latch bolts with throw to maintain fire rating of both single and paired door assemblies.

E. Provide strike with lip length adequate to clear surrounding trim.

F. Provide wrought boxes for strikes at inactive doors, wood frames, and metal frames without integral mortar covers.

G. Provide Von Duprin #154 or equivalent mullion/frame stabilizers at the following application(s) unless provided with deadbolt:

1. Lockable exterior or vestibule paired openings with a fixed or removable hollow metal or aluminum mullion.

2. Lockable exterior or vestibule single doors in aluminum frames.

2.08 PULLS, PUSH BARS, PUSH/PULL PLATES

A. Acceptable manufacturers and respective catalog numbers:

	Ives	Burns	Hager
1. Offset Door Pull (1" dia., 10" CTC)	8190-0	39C	12J
2. Push Plate (.050 6"X 16")	8200 6" X 16"	56	30S 6 x 16
3. Pull Plate (1" dia., 10" CTC - .050" X 4" X 16")	8303-0 4" X 16"	5426C	34J 4 x 16

B. Adjust dimensions of push plates to accommodate stile and rail dimensions, lite and louver cutouts, and adjacent hardware. Where required by adjacent hardware, push plates shall be factory drilled for cylinders or other mortised hardware. All push plates shall be beveled 4 sides and counter sunk.

C. Where required on wide stile doors, install straight pull offset of cylinder to allow for access to cylinder.

D. Where possible, provide back-to-back, and concealed mounting for pulls and push bars. Push bar length shall be 3" less door width, or center of stile to center of stile for stile & rail or full glass doors.

2.09 CLOSERS

A. Acceptable manufacturers and respective catalog numbers:

	Sargent	Norton
1. 4040XP/4040XP EDA	281/281P10	R9500/PR7500

B. Door closers shall be independently certified by ANSI for compliance with ANSI A156.4, Grade 1 (2013).

C. Obtain door closers from a single manufacturer, although several may be indicated as offering products complying with requirements.

D. Provide extra heavy-duty arm (EDA / HD) when closer is to be installed using parallel arm mounting.

E. Hardware supplier shall coordinate with related trades to ensure aluminum frame profiles will accommodate specified door closers.

F. Provide “SPECIAL TEMPLATE - #1728 / #0723” closer arms as required to accommodate aluminum frame head details with “non-structural stops” when closers will be required to utilize parallel arm mounting positions. Frame mounting shoe shall be shortened, and pivot hub height shall be increased to permit frame mounted shoe to be positioned on frame rabbit (rather than the frame stop), and behind the frame stop rather than on top of the frame stop. Contact LCN Door Closers at: 877-671-7011 for pricing and design assistance.

G. Closers shall use high strength cast iron cylinders, forged main arms, and one-piece forged steel pistons.

H. Closers shall utilize a stable fluid withstanding temperature range of +120deg F to -30deg F without seasonal adjustment of closer speed to properly close the door. Closers for fire-rated doors shall be provided with temperature stabilizing fluid that complies with standards UL10C.

I. Unless otherwise specified, all door closers shall have full covers and separate adjusting valves for sweeps, latch, and backcheck.

J. Provide closers for all labeled doors. Provide closer series and type consistent with other closers for similar doors specified elsewhere on the project.

K. Provide closers with adjustable spring power. Size closers to ensure exterior and fire rated doors will consistently close and latch doors under existing conditions. Size all other door closers to allow for reduced opening force not to exceed 5 lbs.

L. Install closers on the room side of corridor doors, stair side of stairways and interior side of exterior doors.

M. Closers shall be furnished complete with all mounting brackets and cover plates as required by door and frame conditions, and by adjacent hardware.

N. Door closers shall be provided with a powder coat finish to provide superior protection against the effects of weathering. Powder coat finish shall successfully pass a 100 hour salt spray test.

O. Pressure Relief Valve, PRV, shall not be acceptable.

2.10 LOW ENERGY ELECTRO-HYDRAULIC AUTOMATIC OPERATORS

A. Acceptable manufacturers and respective catalog numbers:

	LCN
1. Electro-Hydraulic Operator	4640

B. Low energy operators shall be independently certified by ANSI for compliance with ANSI A156.19 (2002).

C. Where low kinetic energy, as defined by ANSI/BHMA Standard A156.19, power operators are indicated for doors required to be accessible to the disabled, provide electrically powered operators complying with the ADA for opening force and time to close standards.

D. The closing action shall be controlled by modern type cast iron door closer cylinder filled with a flat viscosity fluid, stable from +120F to -30F that would require no seasonal adjustments. The closer shall have field adjustable spring power; have two independent closing speed adjustment valves, and hydraulic back-check.

F. Full closing force shall be provided when the power or assist cycle ends.

G. All power operator systems shall include the following features and functions:

1. Provisions for separate conduits to carry high and low voltage wiring in compliance with the National Electrical Code, section 725-31.

2. The operator will be designed with an electronically controlled mechanical clutching mechanism to prevent damage to the operator if the system is actuated while the door is latched or if the door is forced closed during the opening cycle.

3. All covers, mounting plates and arm systems shall be powder coated and successfully pass a minimum of 100 hours testing as outlined in ANSI/BHMA Standard A156.18.

4. UL listed for use on labeled doors.

5. All operators shall be non-handed with spring power over a range of at least four sizes; either 1 through 4 or 2 through 5.

6. The power operator shall incorporate microprocessor controlled digital controls including factory default memory settings, on-board diagnostics, non-volatile memory, and integrated delay and relay for controlling door release devices.

7. Provisions in the control box or module shall provide control {inputs and outputs) for; electric strike delay, auxiliary contacts, sequential operation, fire alarms systems, actuators, swing side sensors, and stop side sensors.

8. Exterior switches shall be weather resistant and mount on a single gang electrical box furnished by Division 26.

H. All electrically powered operators shall include the following features or functions:

1. When an obstruction or resistance to the opening swing is encountered, the operator will pause at that point, then attempt to continue opening the door. If the obstruction or resistance remains, the operator will again pause the door.

2. Easily accessible main power and maintain hold open switches will be provided on the operator.

3. An electronically controlled clutch to provide adjustable opening force.

4. A microprocessor to control all motor and clutch functions.

5. An on-board power supply capable of delivering both 12V and 24V outputs up to a maximum of 1.0 ampere combined load.

6. All input and output power wiring shall be protected by slow blow fuses. These fuses shall be easily replaceable without special tools or component replacement.

7. If electrical failure occurs, the unit shall operate as a standard door closer.

I. Power Operators shall be warranted by the manufacture to be free from defects in material and workmanship for a period of two years.

2.11 KICK PLATES AND MOP PLATES

A. Furnish protective plates as specified in hardware groups.

B. Where specified, provide 10" kick plates, 34" armor plates, and 4" mop plates. Unless otherwise specified, metal protective plates shall be .050" thick; plastic plates shall be 1/8" thick.

C. Protective plates shall be 2" less door width, or 1" less door width at pairs. All protective plates shall be beveled 4 sides and counter sunk.

D. Protection plates over 16" shall not be provided for labeled doors unless specifically approved by door manufacturers listing. When protection plates over 16” are provided for labeled doors, the plate shall be labeled.

E. Where specified, provide surface mounted door edges. Edges shall butt to protective plates. Provide edges with cutouts as required adjacent hardware.

F. Adjust dimensions of protection plates to accommodate stile and rail dimensions, lite and louver cutouts, and adjacent hardware. Where required by adjacent hardware, protection plates shall be factory drilled for cylinders or other mortised hardware.

2.12 OVERHEAD STOPS

A. Acceptable manufacturers and respective catalog numbers:

		Glynn-Johnson	Rixson	Sargent
1.	Heavy Duty Surface Mount	GJ900 Series	9 Series	590
2.	Heavy Duty Concealed Mount	GJ100 Series	1 Series	690

B. Unless otherwise specified, furnish GJ900 series overhead stop for hollow metal or 1-3/4" solid core doors equipped with regular arm surface type closers that swing more than 140 degrees before striking a wall, for hollow metal or 1-3/4" solid core doors that open against equipment, casework, sidelights, or other objects that would make wall bumpers inappropriate, and as specified in hardware groups.

C. Furnish sex bolt attachments for wood and mineral core doors unless doors are supplied with proper reinforcing blocks.

D. Provide special stop only ("SE" suffix) overhead stops when used in conjunction with electronic hold open closers.

E. Do not provide holder function for labeled doors.

2.13 WALL STOPS AND HOLDERS

A. Acceptable manufacturers and respective catalog numbers:

		Ives	Hager	Burns
1.	Wrought Convex Wall Stop	WS406CVX	232W	570
2.	Wrought Concave Wall Stop	WS406CCV	236W	575
3.	Automatic Wall Holder	WS40	326W	533

B. Furnish a stop or holder for all doors.

C. Provide concave style wall stop at all adjacent integral push button locks; provide convex style wall stop at all other locations.

D. Where wall stops are not applicable, furnish overhead stops.

E. Furnish floor stops or hinge pin stops only where specified in hardware sets.

F. Do not provide holder function for labeled doors.

2.14 WEATHERSTRIP, GASKETING

A. Acceptable manufacturers and respective catalog numbers:

		Zero	Pemko	NG	Reese
1.	Weatherstrip	429	2891_PK	700	755
2.	Adhesive Gasket	188	S88	505	797
3.	Mullion Seal/Silencer	8780	5110	510	628
4.	Sweep w/ drip	8198	345_N	C62	354
5.	Drip Cap	142	346	16	R201

B. Weatherstrip and gasketing shall be independently certified by ANSI for compliance with ANSI A156.22 (2005).

C. Where specified in the hardware groups, furnish the above products unless otherwise detailed in groups.

D. Provide weatherstripping all exterior doors and where specified.

E. Provide intumescent and other required edge sealing systems as required by individual fire door listings to comply with positive pressure standards UL 10C.

F. Provide Zero 188 smoke gaskets at all fire rated doors and smoke and draft control assemblies.

G. Provide gasketing for all meeting edges on pairs of fire doors. Gasketing shall be compatible with astragal design provided by door supplier as required for specific fire door listings.

2.15 THRESHOLDS

A. Acceptable manufacturers and respective catalog numbers:

	Zero	Pemko	NGP	Reese
1. Saddle Thresholds	8655	171	425	S205
2. Half Saddle Thresholds	1674	227	324	S239
3. Interlocking Threshold	74A	114	442-5	T550

B. Thresholds shall be independently certified by ANSI for compliance with ANSI A156.21 (2001).

C. Hardware supplier shall verify all finish floor conditions and coordinate proper threshold as required to ensure a smooth transition between threshold and interior floor finish.

E. Threshold Types:

1. Unless otherwise specified, provide saddle threshold similar to Zero 8655 for all exterior openings with an interior floor finish less than or equal to 1/4" in height.

2. Unless otherwise specified, provide half saddle threshold similar to Zero 1674 for all exterior openings with an interior floor finish greater than 1/4" in height. Threshold height shall match thickness of interior floor finish.

2.16 POWER SUPPLIES

A. Provide quantities and types as specified in hardware sets. Shared power supplies will not be accepted without prior approval from the owner.

B. All power supplies shall have the following features:

1. 12/24 VDC Output, field selectable.

2. Class 2 Rated power limited output.

3. Universal 120-240 VAC input.

4. Low voltage DC regulated and filtered.

5. Polarized connector for distribution boards.

6. Fused primary input.

7. AC input and DC output monitoring circuit w/LED indicators.

8. Cover mounted AC Input indication.

9. Tested and certified to meet UL294.

10. NEMA 1 enclosure.

11. Hinged cover w/lock down screws.

12. High voltage protective cover.

C. All power supplies shall incorporate fused distribution boards.

D. All electro-mechanical systems requiring fail safe circuits shall be capable of interfacing with the fire alarm system to cut power to appropriate system components. Unless already provided in another system component, all power supplies utilized in fail safe circuits shall include an integral relay which when connected to the N/C fire alarm contact will cut power to all openings connected to the individual power supply. Power supply, unless otherwise specified, will automatically reset itself when fire alarm relay returns to normal state following a fire alarm.

E. Unless otherwise indicated in the hardware groups or herein, hardware finishes shall be applied over base metals as specified in the following finish schedule:

	HARDWARE ITEM	BHMA FINISH AND BASE MATERIAL
1.	Butt Hinges: Exterior, or Non-Ferrous	630 (US32D – Satin Stainless Steel)

2.	Butt Hinges: Interior	652 (US26D - Satin Chromium)
3.	Continuous Hinges	630 (US32D - Satin Stainless Steel)
4.	Flush Bolts	626 (US26D - Satin Chromium)
5.	Exit Devices	626 (US26D - Satin Chromium)
6.	Locks and Latches	626 (US26D - Satin Chromium)
7.	Pulls and Push Plates/Bars	630 (US32D - Satin Stainless Steel)
8.	Closers	689 (Powder Coat Aluminum)
9.	Protective Plates	630 (US32D - Satin Stainless Steel)
10.	Overhead Stops	630 (US32D - Satin Stainless Steel)
11.	Wall Stops and Holders	630 (US32D - Satin Stainless Steel)
12.	Thresholds	719 (Mill Aluminum)
13.	Weather-strip, Sweeps Drip Caps	Match finish of aluminum doors.
14.	Miscellaneous	626 (US26D - Satin Chromium)

2.17 KEYING

A. Provide all cylinders in keyways as required to accommodate owners existing key system.

B. Provide interchangeable cores for all locks and cylinders.

C. All locks under this section shall be keyed as directed by the owner to an existing Master Key System.

D. Furnish a total of 2 keys per cylinder. Actual cut keys to be determined by owner.

E. Master keys, control keys, and change keys shall be delivered by registered mail to the owner. Construction keys shall be delivered to the contractor.

2.18 KEY CABINETS

A. Acceptable manufacturers and respective catalog numbers:

Lund	Key Control	Telkee
1200-1205 AA	M228-2480	RWC-AWC

B. Furnish 1 each model 1200 or 1205 AA key cabinet with a capacity 1.5 times the number of key sets.

C. Provide one key cabinet with at least one hook for each key set, plus additional hooks for 50% expansion.

D. Furnish key cabinet complete with cam lock, permanent key tags, and change key cards.

E. Hardware supplier shall prepare all key change index records, tag all keys and place permanent file keys in cabinet.

PART 3 EXECUTION

3.01 EXAMINATION

A. Prior to installation of hardware, installer shall examine door frame installation to ensure frames have been set square and plumb. Installer shall examine doors, door

frames, and adjacent wall, floor, and ceiling for conditions, which would adversely affect proper operation and function of door assemblies. Do not proceed with hardware installation until such deficiencies have been corrected.

3.02 INSTALLATION

A. Before hardware installation, general contractor/construction manager shall coordinate a hardware installation seminar with a 1 week notice to all parties involved. The seminar is to be conducted on the installation of hardware, specifically of locksets, closers, exit devices, continuous hinges and overhead stops. Manufacturer's representative of the above products to present seminar. Seminar to be held at the job site and attended by installers of hardware (including low voltage hardware) for aluminum, hollow metal and wood doors. Training to include use of installation manuals, hardware schedule, templates and physical products samples.

B. Shim doors as required to maintain proper operating clearance between door and frame.

C. Install all hardware in accordance with the approved hardware schedule and manufacturer’s instructions for installation and adjustment.

D. Set units level, plumb and true to the line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

E. Provide blocking or reinforcement for all hardware mounted to drywall construction, including wall mounted door stops and holders.

F. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accord with industry standards.

G. Drill appropriate size pilot holes for all hardware attached to wood doors and frames.

H. Unless otherwise specified, locate all hardware in accordance with the recommended locations for builders hardware for standard doors and frames as published by the Door and Hardware Institute (TDH-007-20).

I. Use only fasteners supplied by or approved by the manufacturer for each respective item of hardware.

J. Mortise and cut to close tolerance and conceal evidence of cutting in the finished work.

K. Conceal push and pull bar fasteners where possible. Do not install through bolts through push plates.

L. Install hardware on UL labeled openings in accordance with manufacturer's requirements to maintain the label.

M. Apply self-adhesive gasketing on frame stop at head & latch side and on rabbet of frame at hinge side.

N. Install hardware in accordance with supplemental "S" label instructions on all fire rated openings.

O. Install wall stops to contact lever handles or pulls. Do not mount wall stops on casework, or equipment.

P. Where necessary, adjust doors and hardware as required to eliminate binding between strike and latchbolt. Doors should not rattle.

Q. Overhead stops used in conjunction with electrified hold open closers shall be templated and installed to coincide with engagement of closer hold open position.

R. Install door closers on corridor side of lobby doors, room side of corridor doors, and stair side of stairways.

S. Adjust spring power of door closers to the minimum force required to ensure exterior and fire rated doors will consistently close and latch doors under existing conditions. Adjust all other door closers to ensure opening force does not to exceed 5 lbs.

T. Adjust "sweep", "latch", & "back check" valves on all door closers to properly control door throughout the opening and closing cycle. Adjust total closing speed as required to comply with all applicable state and local building codes.

U. Install "hardware compatible" (bar stock) type weatherstripping continuously for an uninterrupted seal. Adjust templating for parallel arm door closers, exit devices, etc., as required to accommodate weatherstripping.

V. Unless otherwise specified or detailed, install thresholds with the bevel in vertical alignment with the outside door face. Notch and closely fit thresholds to frame profile. Set thresholds in full bed of sealant.

W. Compress sweep during installation as recommended by sweep manufacturer to facilitate a water-resistant seal.

X. Deliver to the owner 1 complete set of installation and adjustment instructions, and tools as furnished with the hardware.

3.03 FIELD QUALITY CONTROL

A. After installation has been completed, the hardware supplier and manufacturer's representative for locksets, door closers, exit devices, and overhead stops shall check the project and verify compliance with installation instructions, adjustment of all hardware items, and proper application according to the approved hardware schedule. Hardware supplier shall submit a list of all hardware that has not been installed correctly.

B. After installation has been completed, the hardware supplier and manufacturer's representative shall meet with the owner to explain the functions, uses, adjustment, and maintenance of each item of hardware. Hardware supplier shall provide the owner with a copy of all wiring diagrams. Wiring diagrams shall be opening specific and include both a riser diagram and point to point diagram showing all wiring terminations.

3.04 ADJUSTMENT AND CLEANING

A. At final completion, and when H.V.A.C. equipment is in operation, installer shall make final adjustments to and verify proper operation of all door closers and other items of hardware. Lubricate moving parts with type lubrication recommended by the manufacturer.

B. All hardware shall be left clean and in good operation. Hardware found to be disfigured, defective, or inoperative shall be repaired or replaced.

3.05 HARDWARE SCHEDULE

A. The following schedule of hardware groups are intended to describe opening function. The hardware supplier is cautioned to refer to the preamble of this specification for a complete description of all materials and services to be furnished under this section.

HW SET 01

	EA	HINGES	(AS SPECIFIED)	IVE
1	EA	PASSAGE SET	ND10S	SCH
1	EA	WALL STOP	WS406/407CCV	IVE

FUNCTION: ND10 (F75) PASSAGE LATCH
BOTH LEVERS ALWAYS UNLOCKED

HW SET 02

	EA	HINGES	(AS SPECIFIED)	IVE
1	EA	ENTRANCE/OFFICE LOCK	ND50	SCH
1	EA	WALL STOP	WS406/407CCV	IVE

FUNCTION: ND50 (F82) ENTRANCE/OFFICE LOCK
PUSH-BUTTON LOCKING. PUSH-BUTTON LOCKS OUTSIDE LEVER UNTIL UNLOCKED WITH KEY OR BY TURNING INSIDE LEVER.

HW SET 02A

	EA	HINGES	(AS SPECIFIED)	IVE
1	EA	ENTRANCE/OFFICE LOCK	ND50	SCH
1	EA	SURFACE CLOSER	4040XP / 4040XP EDA	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	WALL STOP	WS406/407CCV	IVE
1	EA	SMOKE SEALS	188S (AT RATED OR SMOKE & DRAFT CONTROL DRS ONLY)	ZER

FUNCTION: ND50 (F82) ENTRANCE/OFFICE LOCK
PUSH-BUTTON LOCKING. PUSH-BUTTON LOCKS OUTSIDE LEVER UNTIL UNLOCKED WITH KEY OR BY TURNING INSIDE LEVER.

HW SET 03

	EA	HINGES	(AS SPECIFIED)	IVE
1	EA	CLASSROOM LOCK	ND70	SCH
1	EA	WALL STOP	WS406/407CCV	IVE

FUNCTION: ND70 (F84) CLASSROOM LOCK
OUTSIDE LEVER LOCKED AND UNLOCKED BY KEY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET 04

	EA	HINGES	(AS SPECIFIED)	IVE
1	EA	CONST LATCHING BOLT	FB51T / FB61T	IVE
1	EA	CLASSROOM LOCK	ND70	SCH
2	EA	WALL STOP & HOLDER	WS40	IVE
1	EA	OVERLAP ASTRAGAL	(BY DOOR SUPPLIER)	

FUNCTION: ND70 (F84) CLASSROOM LOCK
OUTSIDE LEVER LOCKED AND UNLOCKED BY KEY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET 04A

	EA	HINGES	(AS SPECIFIED)	IVE
1	EA	CONST LATCHING BOLT	FB51T / FB61T	IVE
1	EA	CLASSROOM LOCK	ND70	SCH
1	EA	COORDINATOR	COR X FL	IVE
2	EA	SURFACE CLOSER	4040XP / 4040XP EDA	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	IVE
2	EA	WALL STOP	WS406/407CVX	IVE
1	EA	SEALS	188S	ZER
1	EA	MEETING STILE SEAL	S771	PEM
1	EA	OVERLAP ASTRAGAL	(BY DOOR SUPPLIER)	

FUNCTION: ND70 (F84) CLASSROOM LOCK
OUTSIDE LEVER LOCKED AND UNLOCKED BY KEY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET: 05

	EA	HINGES	(AS SPECIFIED)	IVE
1	EA	CONST LATCHING BOLT	FB51T / FB61T	IVE
1	EA	CLASSROOM LOCK	ND70	SCH
1	EA	COORDINATOR	COR X FL	IVE
2	EA	SURFACE CLOSER	4040XP SCUSH	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	IVE
1	EA	SEALS	188S	ZER
1	EA	MEETING STILE SEAL	S771	PEM
1	EA	OVERLAP ASTRAGAL	(BY DOOR SUPPLIER)	

FUNCTION: ND70 (F84) CLASSROOM LOCK
OUTSIDE LEVER LOCKED AND UNLOCKED BY KEY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET 06

	EA	HINGES	(AS SPECIFIED)	IVE
1	EA	CLASSROOM LOCK	ND70	SCH
1	EA	SURFACE CLOSER	4040XP / 4040XP EDA	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	WALL STOP	WS406/407CCV	IVE
1	EA	SMOKE SEALS	188S (AT RATED OR SMOKE & DRAFT CONTROL DRS ONLY)	ZER

FUNCTION: ND70 (F84) CLASSROOM LOCK
OUTSIDE LEVER LOCKED AND UNLOCKED BY KEY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET 07

	EA	HINGES	(AS SPECIFIED)	IVE
1	EA	CLASSROOM LOCK	ND70	SCH
1	EA	SURFACE CLOSER	4040XP / 4040XP EDA	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	WALL STOP & HOLDER	WS40	IVE

FUNCTION: ND70 (F84) CLASSROOM LOCK
OUTSIDE LEVER LOCKED AND UNLOCKED BY KEY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET 08

	EA	HINGES	(AS SPECIFIED)	IVE
1	EA	STOREROOM LOCK	ND80	SCH
1	EA	SURFACE CLOSER	4040XP SHCUSH	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	SEALS	188S	ZER

FUNCTION: ND80 (F86) STOREROOM LOCK
OUTSIDE LEVER FIXED. ENTRANCE BY KEY ONLY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET 09

1	EA	CONTINUOUS HINGE	700	IVE
1	EA	STOREROOM LOCK	ND80	SCH
1	EA	LOCK GUARD	LG	IVE
1	EA	OH STOP	100S	GLY
1	EA	SURFACE CLOSER	4040XP EDA	LCN
1	EA	RAIN DRIP	142	ZER
1	EA	WEATHERSTRIP	(BY DR/FR SUPPLIER)	
1	EA	DOOR SWEEP	8198	ZER
1	EA	THRESHOLD	(PROFILE AS REQUIRED)	ZER

FUNCTION: ND80 (F86) STOREROOM LOCK
OUTSIDE LEVER FIXED. ENTRANCE BY KEY ONLY. INSIDE LEVER ALWAYS UNLOCKED.

HW SET 10

	EA	HINGES	(AS SPECIFIED)	IVE
1	EA	POWER TRANSFER	EPT10	VON
1	EA	EU STOREROOM LOCK	ND80EU	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	SMOKE SEALS	188S (AT RATED OR SMOKE & DRAFT CONTROL DRS ONLY)	ZER
1	EA	CREDENTIAL READER	(BY OTHERS)	
1	EA	POWER SUPPLY	PS902 900-4R	SCE
1	EA	WIRING DIAGRAMS	RISER & POINT-TO-POINT (BY HARDWARE SUPPLIER)	

FUNCTION: ND80EU ELECTRICALLY UNLOCKED (FAIL SECURE)
OUTSIDE LEVER CONTINUOUSLY LOCKED UNTIL UNLOCKED BY KEY OR ELECTRIC CURRENT. AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS CLOSED. INSIDE LEVER ALWAYS FREE FOR IMMEDIATE EXIT. VALID CREDENTIAL UNLOCKS DOOR.

HW SET 11

	EA	HINGES	(AS SPECIFIED)	IVE
1	EA	POWER TRANSFER	EPT10	VON
1	EA	EU STOREROOM LOCK	ND80EU	SCH
1	EA	LOCK GUARD	LG	IVE
1	EA	SURFACE CLOSER	4040XP SCUSH	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	RAIN DRIP	142	ZER
1	SET	GASKETING	429	ZER
1	EA	DOOR SWEEP	8198	ZER
1	EA	THRESHOLD	(PROFILE AS REQUIRED)	ZER
1	EA	CREDENTIAL READER	(BY OTHERS)	
1	EA	POWER SUPPLY	PS902 900-4R	SCE
1	EA	WIRING DIAGRAMS	RISER & POINT-TO-POINT (BY HARDWARE SUPPLIER)	

FUNCTION: ND80EU ELECTRICALLY UNLOCKED (FAIL SECURE)
OUTSIDE LEVER CONTINUOUSLY LOCKED UNTIL UNLOCKED BY KEY OR ELECTRIC CURRENT. AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS CLOSED. INSIDE LEVER ALWAYS FREE FOR IMMEDIATE EXIT. VALID CREDENTIAL UNLOCKS DOOR.

HW SET 12

1	EA	CONT. HINGE	705	IVE
1	EA	POWER TRANSFER	EPT10	VON
1	EA	EU STOREROOM LOCK	ND80EU	SCH
1	EA	LOCK GUARD	LG	IVE
1	EA	SURFACE CLOSER	4040XP SCUSH	LCN
1	EA	ARMOR PLATE	8400 34" X 2" LDW B-CS	IVE
1	EA	RAIN DRIP	142	ZER
1	SET	GASKETING	429	ZER
1	EA	DOOR SWEEP	8198	ZER
1	EA	THRESHOLD	(PROFILE AS REQUIRED)	ZER
1	EA	CREDENTIAL READER	(BY OTHERS)	
1	EA	POWER SUPPLY	PS902 900-4R	SCE
1	EA	WIRING DIAGRAMS	RISER & POINT-TO-POINT (BY HARDWARE SUPPLIER)	

FUNCTION: ND80EU ELECTRICALLY UNLOCKED (FAIL SECURE)
OUTSIDE LEVER CONTINUOUSLY LOCKED UNTIL UNLOCKED BY KEY OR ELECTRIC CURRENT. AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS CLOSED. INSIDE LEVER ALWAYS FREE FOR IMMEDIATE EXIT. VALID CREDENTIAL UNLOCKS DOOR.

HW SET 13

	EA	HINGES	(AS SPECIFIED)	IVE
1	EA	PANIC HARDWARE	LD-99-NL	VON
1	EA	INTERCHANGEABLE CORE	(CYLINDER AS REQUIRED)	SCH
1	EA	SURFACE CLOSER	4040XP SCUSH	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	SMOKE SEALS	188S (AT RATED OR SMOKE & DRAFT CONTROL DRS ONLY)	ZER

FUNCTION: (NL - LESS DOGGING) LATCHBOLT RETRACTED INSIDE BY EXIT DEVICE PUSH PAD AND OUTSIDE BY KEY IN CYLINDER. DOOR LOCKS WHEN KEY IS REMOVED AND DOOR IS CLOSED

HW SET 14

	EA	HINGES	(AS SPECIFIED)	IVE
2	EA	PANIC HARDWARE	LD-9927-L-2SI-LBR	VON
2	EA	INTERCHANGEABLE CORE	(CYLINDER AS REQUIRED)	SCH
2	EA	SURFACE CLOSER	4040XP / 4040XP EDA	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	IVE
2	EA	WALL STOP & HOLDER	WS40	IVE

FUNCTION: LATCHBOLT RETRACTED INSIDE BY EXIT DEVICE PUSH PAD AND OUTSIDE BY LEVER. KEY IN EXTERIOR CYLINDER
LOCKS OR UNLOCKS LEVER.

HW SET 15

2	EA	CONTINUOUS HINGE	700	IVE
1	EA	KEYED REMOVABLE MULLION	KR-4954 STAB	VON
1	EA	PANIC HARDWARE	CD-99-EO	VON
1	EA	PANIC HARDWARE	CD-99-NL-OP	VON
4	EA	INTERCHANGEABLE CORE	(CYLINDER AS REQUIRED)	SCH
2	EA	90 DEG OFFSET PULL	8190 10"	IVE
2	EA	OH STOP	100S	GLY
2	EA	SURFACE CLOSER	4040XP EDA	LCN
1	EA	RAIN DRIP	142	ZER
1	EA	MULLION SEAL	8780	ZER
	EA	WEATHERSTRIP	(BY DR/FR SUPPLIER)	
2	EA	DOOR SWEEP	8198	ZER
1	EA	THRESHOLD	(PROFILE AS REQUIRED)	ZER

FUNCTION: (NL) LATCHBOLT RETRACTED INSIDE BY EXIT DEVICE PUSH PAD AND OUTSIDE BY KEY IN CYLINDER. DOOR LOCKS WHEN KEY IS REMOVED AND DOOR IS CLOSED. ACCESS FROM EXTERIOR WHEN EXIT DEVICE PUSH PAD IS DOGGED DOWN.

HW SET 16

2	EA	CONTINUOUS HINGE	700	IVE
1	EA	PANIC HARDWARE	CD-9947-EO	VON
1	EA	PANIC HARDWARE	CD-9947-NL-OP	VON
3	EA	INTERCHANGEABLE CORE	(CYLINDER AS REQUIRED)	SCH
2	EA	90 DEG OFFSET PULL	8190 10"	IVE
2	EA	OH STOP	100S	GLY
2	EA	SURFACE CLOSER	4040XP EDA	LCN

FUNCTION: (NL) LATCHBOLT RETRACTED INSIDE BY EXIT DEVICE PUSH PAD AND OUTSIDE BY KEY IN CYLINDER. DOOR LOCKS WHEN KEY IS REMOVED AND DOOR IS CLOSED. ACCESS FROM EXTERIOR WHEN EXIT DEVICE PUSH PAD IS DOGGED DOWN.

HW SET 17

2	EA	CONTINUOUS HINGE	700 EPT	IVE
2	EA	POWER TRANSFER	EPT10	VON
1	EA	KEYED REMOVABLE MULLION	KR-4954 STAB	VON
1	EA	ELEC PANIC HARDWARE	QEL-99-EO	VON
1	EA	ELEC PANIC HARDWARE	QEL-99-NL-OP	VON
2	EA	INTERCHANGEABLE CORE	(CYLINDER AS REQUIRED)	SCH
2	EA	90 DEG OFFSET PULL	8190 10"	IVE
2	EA	OH STOP	100S	GLY
2	EA	SURFACE CLOSER	4040XP EDA	LCN
1	EA	RAIN DRIP	142	ZER
1	EA	MULLION SEAL	8780	ZER
	EA	WEATHERSTRIP	(BY DR/FR SUPPLIER)	
2	EA	DOOR SWEEP	8198	ZER
1	EA	THRESHOLD	(PROFILE AS REQUIRED)	ZER
1	EA	CREDENTIAL READER	(BY OTHERS)	
1	EA	POWER SUPPLY	PS902 900-4R	SCE
1	EA	WIRING DIAGRAMS	RISER & POINT-TO-POINT (BY HARDWARE SUPPLIER)	

FUNCTION: (NL) LATCHBOLT RETRACTED INSIDE BY EXIT DEVICE PUSH PAD AND OUTSIDE BY KEY IN CYLINDER. DOOR LOCKS WHEN KEY IS REMOVED AND DOOR IS CLOSED.
A VALID CREDENTIAL RETRACTS LATCH BOLT AND PUSH PAD ON BOTH DOORS.

HW SET 18

2	EA	CONTINUOUS HINGE	700 EPT	IVE
2	EA	POWER TRANSFER	EPT10	VON
1	EA	KEYED REMOVABLE MULLION	KR-4954 STAB	VON
1	EA	ELEC PANIC HARDWARE	QEL-99-EO	VON
1	EA	ELEC PANIC HARDWARE	QEL-99-NL-OP	VON
2	EA	INTERCHANGEABLE CORE	(CYLINDER AS REQUIRED)	SCH
2	EA	90 DEG OFFSET PULL	8190 10"	IVE
2	EA	OH STOP	100S	GLY
1	EA	SURFACE CLOSER	4040XP EDA	LCN
1	EA	SURF. AUTO OPERATOR	4642	LCN
2	EA	ACTUATOR, TOUCH	8310-853 / 8310-818	LCN
1	EA	MULLION SEAL	8780	ZER
1	EA	CREDENTIAL READER	(BY OTHERS)	
1	EA	POWER SUPPLY	PS902 900-4R	SCE
1	EA	WIRING DIAGRAMS	RISER & POINT-TO-POINT (BY HARDWARE SUPPLIER)	

FUNCTION: (NL) LATCHBOLT RETRACTED INSIDE BY EXIT DEVICE PUSH PAD AND OUTSIDE BY KEY IN CYLINDER. DOOR LOCKS WHEN KEY IS REMOVED AND DOOR IS CLOSED.
THIS DOOR HAS A POWER OPERATOR. INTERIOR ACTUATOR ALWAYS ACTIVE TO UNLOCK AND OPEN THE DOOR. A VALID CREDENTIAL WILL UNLOCK BOTH DOORS AND MAKE THE EXTERIOR ACTUATOR ACTIVE.

HW SET 19

2	EA	CONTINUOUS HINGE	700 EPT	IVE
2	EA	POWER TRANSFER	EPT10	VON
1	EA	KEYED REMOVABLE MULLION	KR-4954 STAB	VON
1	EA	ELEC PANIC HARDWARE	QEL-99-EO	VON
1	EA	ELEC PANIC HARDWARE	QEL-99-NL-OP	VON
2	EA	INTERCHANGEABLE CORE	(CYLINDER AS REQUIRED)	SCH
2	EA	90 DEG OFFSET PULL	8190 10"	IVE
2	EA	OH STOP	100S	GLY
1	EA	SURFACE CLOSER	4040XP EDA	LCN
1	EA	SURF. AUTO OPERATOR	4642	LCN
2	EA	ACTUATOR, TOUCH	8310-853 / 8310-818	LCN
1	EA	RAIN DRIP	142	ZER
1	EA	MULLION SEAL	8780	ZER
	EA	WEATHERSTRIP	(BY DR/FR SUPPLIER)	
2	EA	DOOR SWEEP	8198	ZER
1	EA	THRESHOLD	(PROFILE AS REQUIRED)	ZER
1	EA	CREDENTIAL READER	(BY OTHERS)	
1	EA	POWER SUPPLY	PS902 900-4R	SCE
1	EA	WIRING DIAGRAMS	RISER & POINT-TO-POINT (BY HARDWARE SUPPLIER)	

FUNCTION: (NL) LATCHBOLT RETRACTED INSIDE BY EXIT DEVICE PUSH PAD AND OUTSIDE BY KEY IN CYLINDER. DOOR LOCKS WHEN KEY IS REMOVED AND DOOR IS CLOSED.
THIS DOOR HAS A POWER OPERATOR. INTERIOR ACTUATOR ALWAYS ACTIVE TO UNLOCK AND OPEN THE DOOR. A VALID CREDENTIAL WILL UNLOCK BOTH DOORS AND MAKE THE EXTERIOR ACTUATOR ACTIVE.

HW SET 20

	EA	HINGES	(AS SPECIFIED)	IVE
1	EA	CLASSROOM SECURITY	ND78	SCH
1	EA	OH STOP & HOLDER	90H	GLY

FUNCTION: (F05) CLASSROOM LOCK
LATCHBOLT RETRACTED BY LEVER FROM EITHER SIDE UNLESS OUTSIDE IS LOCKED BY KEY. UNLOCKED FROM OUTSIDE BY KEY. INSIDE LEVER ALWAYS FREE FOR IMMEDIATE EXIT. AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS CLOSED.

PROVIDE COMPLETE LATCHING ASSEMBLY INCLUDING LOCK BODY, STRIKE, SCALP, SPINDLE, LEVERS, ROSES, CYLINDER, CYLINDER CAM, BLOCKING RING, AND ALL REQUIRED FASTENERS. HARDWARE SUPPLIER SHALL COORDINATE WITH RELATED TRADES TO INSURE DOOR AND FRAME CONSTRUCTION WILL ACCOMMODATE SPECIFIED HARDWARE.

HW SET 21

	EA	HINGES	(AS SPECIFIED)	IVE
1	EA	POWER TRANSFER	EPT10	VON
1	EA	EU STOREROOM LOCK	ND80EU	SCH
1	EA	OH STOP	100S	GLY
1	EA	SURFACE CLOSER	4040XP EDA	LCN
1	EA	CREDENTIAL READER	(BY OTHERS)	
1	EA	POWER SUPPLY	PS902 900-4R	SCE
1	EA	WIRING DIAGRAMS	RISER & POINT-TO-POINT (BY HARDWARE SUPPLIER)	

FUNCTION: ELECTRICALLY UNLOCKED (FAIL SECURE)
OUTSIDE LEVER UNLOCKED BY 24V DC. LATCHBOLT RETRACTED BY KEY OUTSIDE OR LEVER INSIDE. AUXILIARY LATCH DEADLOCKS LATCHBOLT WHEN DOOR IS CLOSED. INSIDE LEVER ALWAYS FREE FOR IMMEDIATE EXIT. VALID CREDENTIAL UNLOCKS DOOR.

PROVIDE COMPLETE LATCHING ASSEMBLY INCLUDING LOCK BODY, STRIKE, SCALP, SPINDLE, LEVERS, ROSES, CYLINDER, CYLINDER CAM, BLOCKING RING, AND ALL REQUIRED FASTENERS. HARDWARE SUPPLIER SHALL COORDINATE WITH RELATED TRADES TO INSURE DOOR AND FRAME CONSTRUCTION WILL ACCOMMODATE SPECIFIED HARDWARE.

HW SET 22

ALL HARDWARE BY DOOR SUPPLIER.

HW SET 23

	EA	HINGES	(AS SPECIFIED)	IVE
1	EA	PUSH PLATE	8200 6" X 16"	IVE
1	EA	PULL PLATE	8303 10" 4" X 16"	IVE
1	EA	SURFACE CLOSER	4040XP / 4040XP EDA	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	IVE
1	EA	WALL STOP	WS406/407CVX	IVE

FUNCTION: PUSH/PULL

Door Numbers	HwSet#
01A	19
01B	18
03A	21
03B	11
04	02
05	02
06	02
07	02
08	02
09	02
10	02
11	02A
12	02
13	03
14	01
15A	14
15B	09
15C	09
16A	06
16B	06
17	13
18	11
19A	15
19B	15
20	08
21	23
22	23

Door Numbers	HwSet#
23A	**07**
23B	**07**
23C	**12**
25A	**16**
25B	**17**
26A	**20**
26B	**09**
27A	**20**
27B	**09**
28A	**14**
29A	**14**
29B	**15**
30	**05**
31	**10**
32	**04A**
34	**22**

END OF SECTION

SECTION 08 8000

GLAZING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Glazing units for doors and other framed and glazed systems.

B. Glazing compounds and accessories.

1.03 DEFINITIONS

A. Sealed Insulating Glass Unit Surfaces:

1. Surface No. 1: Exterior surface of outer lite.
2. Surface No. 2: Interior surface of outer lite.
3. Surface No. 3: Exterior surface of inner lite.
4. Surface No. 4: Interior surface of inner lite.

B. Airspace or Interspace: Space between lites of an insulating glass unit that contains dehydrated air or other inert specified gas.

C. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

D. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C1036.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

B. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation to discuss conformance with project requirements, manufacturer installation requirements, affected adjacent materials and system, and site conditions.

1. Attendees shall include contractor, glazing installer, and installers of adjacent materials and systems.
2. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data on each type of Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.

C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.

1. Provide written certificate stating that products of this section meet or exceed specified requirements.

D. Shop Drawings: Submit manufacturer's or fabricator's shop drawings, including plans, elevations, sections, and details, indicating glass dimensions, tolerances, types, thicknesses, and coatings.

1. Submit calculations prepared by glazing material manufacturer indicating recommendations for glass thickness and heat treating of glazing materials as a result of heat stress, building orientation, inside window treatments, shading by exterior building components, and wind loading.

2. Identify factors influencing breakage probability along with projected breakage probability anticipated by calculations.

E. Delegated-Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

F. Framing System Manufacturer Approval: Provide letter from framing system manufacturer that glazing will be installed in that manufacturer has reviewed and approved project and submitted shop drawing details including clearances, and glazing methods.

G. Glass Samples: Provide 12 inch square samples of each type of glass products other than clear monolithic vision glass.

1. Insulating units.

2. Laminated glass.

3. Tinted glass.

4. Coated glass.

H. Glazing Accessory Samples: Provide samples in 12 inch lengths for the following products;

1. For sealants and colored spacers.

2. For sealants.

3. For colored spacers.

4. Install sealant Samples between two strips of material representative in color of the adjoining framing system.

I. Manufacturer Qualification Statement.

J. Fabricator Qualification Statement.

K. Installer Qualification Statement.

L. Sample Warranties: For special warranties.

1.06 CLOSEOUT SUBMITTALS

A. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

B. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

C. Maintenance Data: Provide manufacturer instructions for maintenance of installed products.

1.07 QUALITY ASSURANCE

A. Perform Work in accordance with GANA (GM) for glazing installation methods. Maintain one copy on site.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum ten years of documented experience.

C. Fabricator Qualifications: Glass unit fabricators shall be currently certified by the glass unit manufacturer whose glass units the fabricator utilizes for glass fabrications; for a minimum of 3 years.

D. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years documented experience.

E. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this Section.

F. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

G. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

H. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021 to conduct the testing indicated.

I. Preconstruction Testing:

1. Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.

a. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.

b. Use ASTM C1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.

c. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

J. Labeling:

1. Safety glazing: Permanently mark safety glazing with a certification label of a certifying agency acceptable to code officials. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

2. Fire-protection-rated glazing labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to code officials. Label shall indicate manufacturer's name, test standard, and whether glazing is for use in wall assemblies, fire windows, fire door assemblies, whether or not glazing passes fire door assembly hose-stream test, whether or not glazing meets 450 deg F temperature rise for criteria for 30 minutes and the fire-resistance rating in minutes.

K. Fire-protection-rated glazing:

1. Minimum standards are provided. Provide fire rated glazing in fire rated wall assemblies in accordance with applicable codes.

2. Fire door assemblies:

a. Glazing material, including transoms and sidelights, shall be tested in accord with NFPA 257 or UL 9, including the hose stream test.

b. 20-minute fire door assembly: Glazing material shall have a minimum fire-protection-rated glazing of 20-minutes and shall be exempt from the hose stream test.

3. Fire window assemblies: Glazing material shall be tested in accord with and shall meet the acceptance criteria of NFPA 257 or UL 9, including the hose-stream test.

4. Fire-protection-rated glazing shall comply with NFPA 80.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.09 WARRANTY

A. Glass Replacement Warranty: Provide manufacturer warranty covering glazing materials and labor to replace glazing damaged for any reason other than natural disasters, vandalism or damage resulting from accident or abuse arising out of Owner's operations.

1. Warranty Period: Two years from date of Substantial Completion.

B. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

1. Warranty Period: Ten years from date of Substantial Completion.

C. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1. Warranty Period: Ten years from date of Substantial Completion.

D. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: Ten years from date of Substantial Completion.

E. Installer Special Warranty: Installers special warranty covering defects resulting from materials and workmanship for the Work of this Section.

1. Defects include failure of the system to prevent water from entering the structure below or behind, and failure of materials to perform in the intended use.
2. Warranty Period: Two years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS, EXTERIOR GLAZING ASSEMBLIES

A. Delegated-Design: Engage a professional engineer registered in the State of Louisiana to design glazing.

1. Design glazing in accordance with ASTM E1300. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.

B. Performance Requirements:

1. General: Provide type and thickness of glazing to support loads.

a. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.

b. Center of glass deflection to be less than 1/60 of the short dimension length and no greater than 1 inch (25mm) under specified loads.

2. Wind loads: Comply with project wind load criteria in accordance with applicable project codes.

3. Seismic Loads: Design and size glazing components to withstand seismic loads and sway displacement in accordance with the requirements of ASCE 7.

4. Glass thicknesses listed are minimum.

5. Thermal Insulated Glazing Units: Units shall comply with the requirements of ASTM E2190 and be certified by Associated Laboratories, Inc., (ALI) or Insulating Glass Certification Council (IGCC) for Class A.

6. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data, unless noted otherwise.

7. Tempered and Heat-treated Glass:

a. Glazing materials, whether in monolithic state or as a lite of a thermal insulated unit, shall be tempered or otherwise heat-treated where required by glass manufacturer's design calculations to resist stress caused by glass orientations, sizes and configurations, heat stress, inherent imperfections, wind loading, glazing conditions, temperature differential, inside window treatments or other conditions affecting breakage probability.

b. Orient lites with roll distortion parallel to head and sill members.

c. Maximum allowable breakage probability at design loads shall be eight lites per thousand for vertical glazing.

8. Safety glazing: Tempered, laminated, and human impact safety rated glazing materials, when required, shall comply with safety glazing requirements of CPSC 16-CFR, Part 1201, Category II, with testing requirements of ASTM C1048.

a. Provide tempered and safety glazing at locations indicated on Drawings and as required by applicable codes.

b. Coordinate with applicable code requirements for locations of safety glazing.

9. Fire Rated Glazing:

a. Minimum standards are specified. Provide fire rated glazing in fire rated wall assemblies in accordance with applicable codes.

10. Tinted glass types: Whether used in a monolithic state or as a lite of a thermal insulated unit, shall each be the product of a single manufacturer.

C. Air and Water Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure air and water barrier.

D. Windborne-Debris-Impact Resistance Performance: Shall be tested in accordance with ASTM E1886, information in ASTM E1996, and TAS 201/203.

1. Large - Missile Impact: For exterior glazing systems located within 30 feet of grade.

2.02 PERFORMANCE REQUIREMENTS, INTERIOR GLAZING ASSEMBLIES

A. Performance Requirements:

1. General: Provide type and thickness of glazing to support loads.

a. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.

b. Center of glass deflection to be less than 1/60 of the short dimension length and no greater than 1 inch (25mm) under specified loads.

2. Tempered and Heat-treated Glass:

a. Glazing materials shall be tempered or otherwise heat-treated where required by glass manufacturer's design calculations to resist stress caused by glass orientations, sizes and configurations, heat stress, inherent imperfections, loading, glazing conditions, temperature differential, window treatments or other conditions affecting breakage probability.

b. Orient lites with roll distortion parallel to head and sill members.

c. Maximum allowable breakage probability at design loads shall be eight lites per thousand for vertical glazing. --

3. Safety glazing: Tempered, laminated, and human impact safety rated glazing materials, when required, shall comply with safety glazing requirements of CPSC 16-CFR, Part 1201, Category II, with testing requirements of ASTM C1048.

a. Provide tempered and safety glazing at locations indicated on Drawings and as required by applicable codes.

b. Coordinate with applicable code requirements for locations of safety glazing.

4. Fire Rated Glazing:

a. Minimum standards are provided. Provide fire rated glazing in fire rated wall assemblies in accordance with applicable codes.

5. Tinted glass types: Whether used in a monolithic state or as a lite of a thermal insulated unit, shall each be the product of a single manufacturer.

2.03 MANUFACTURERS

A. Float Glass Manufacturers: Subject to compliance with requirements.

1. AGC Glass North America, Inc. www.agcglass.com.

2. Cardinal FG Company. www.cardinalcorp.com.

3. Guardian Industries. www.guardianglass.com.

4. Pilkington North America Inc. www.pilkington.com.
5. Vitro Architectural Glass. www.vitroglazings.com.

B. Low-Emissivity (Low-E) Glass Manufacturers: Subject to compliance with requirements.
1. AGC Glass North America, Inc. www.agcglass.com.
2. Cardinal FG Company. www.cardinalcorp.com.
3. Guardian Industries. www.guardianglass.com.
4. Pilkington North America Inc. www.pilkington.com.
5. Vitro Architectural Glass. www.vitroglazings.com.

C. Laminated Glass Manufacturers:
1. Cardinal Glass Industries: www.cardinalcorp.com.
2. Viracon, Architectural Glass segment of Apogee Enterprises, Inc: www.viracon.com.

D. Fire-Resistance-Rated Glass Manufacturers: Subject to compliance with requirements.
1. Provide products as specified and as required to achieve indicated fire-rating.
2. Basis of Design: Technical Glass Products (TGP); Fire-resistant Firelite Plus, Firelite NT and Pyrostop, depending on rating required.
3. Vetrotech Saint-Gobain; Fire-resistant Keralite FR-F, Keralite FR-L, Keralite FR-Ultra, Contraflam and Contraflam Structure, depending on rating required.
4. SAFTIFIRST, a division of O'Keeffe's Inc; Fire-resistant products meeting the requirements of ASTM E119 Hose Stream Test and CPSC Category I and Category II safety and human impact glazing standards.

2.04 FABRICATORS

A. General: Glass unit fabricators shall be certified by the glass unit manufacturer whose glass units the fabricator utilizes for glass fabrications.

B. Glass Unit Fabricators: Subject to compliance with specified requirements.
1. Oldcastle Building Envelope (Dallas, TX)
2. Trulite Glass & Aluminum Solutions (Peachtree City, GA)
3. Viracon (Owatonna, MN)
4. HMI Cardinal (Louisville, KY)
5. Aldora Aluminum and Glass Products Inc. (Coral Springs, FL)
6. American Insulated Glass LLC. (Conley, GA.)
7. Cristacurva (Houston, TX)
8. Gardner Glass Products Inc. (North Wilkesboro, NC)
9. GGI (Secaucus, N.J.)
10. Glassfab Tempering Services (Tracy, CA)
11. Safti First (Brisbane, CA)

12. SIGCO Inc. (Westbrook, ME)
13. Vitrum Glass Group (Langley, British Columbia, Canada)
14. Custom Glass Products (Weston, WI)
15. Glaz-Tech Industries Inc. (Tucson, AZ)
16. Nashville Tempered Glass Inc. (Nashville, TN)
17. Northwestern Industries (Seattle, WA)

2.05 THERMAL UNIT DESIGN, EXTERIOR LOCATIONS

A. Basis of Design: Insulated glazing units by Guardian Industries. www.guardianglass.com.
   1. Drawing Designation: GL-1.
   2. Drawing Designation: GL-2.
   3. Exterior insulated glazing units shall consist of two 1/4 inch thick panes of glass with 1/2 inch air or argon filled space in between. Factory sealed and complying with the requirements of this Section.
   4. Selections as indicated on Drawings and as acceptable to Architect.

2.06 GLASS MATERIALS

A. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

B. General flat glass standard: Comply with ASTM C1036 as follows:
   1. Transparent flat glass, clear: Type I, Class 1-Clear, Quality - Q3.
   2. Transparent flat glass, tinted: Type I, Class 2-Tinted, Quality - Q3.
   3. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3. Fabricate by horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

C. Monolithic Glass: Provide low iron, ultra clear safety glazing unless indicated otherwise.
   1. Clear tempered monolithic glass: 1/4 inch thickness, fully tempered, complying with ASTM C1048.

D. Laminated Glazing: Provide low iron, ultra clear safety glazing unless indicated otherwise.
   1. Laminated Monolithic Glass: Laminated glass shall meet the requirements of ASTM C1172, with no tendency to bubble, discolor or lose physical or mechanical properties after fabrication and installation.
   2. Laminated Lite: Clear color laminated float glass, formed from two sheets of 1/4" thickness heat-strengthened glass laminated with interlayer; minimum nominal 9/16" lite thickness.

3. Interlayer lamination: Provide items as part of a complete assembly meeting project requirements and acceptable to glazing unit or system manufacturer for project specific application.
    a. Selection: Dupont SentryGlass or Dupont SentryGlass Plus.
    b. 0.060" thickness, clear color polyvinyl butyral (PVB) interlayer or other types of interlayer laminations complying with requirements are acceptable.

2.07 SPACER AND SEALING MATERIALS

A. Spacer, Cold Edge: Manufacturer's standard stainless steel or aluminum spacer with welded, soldered, fused or bent corners and welded, soldered or fused splices and joints, filled with desiccant; to provide a 1/2 inch thickness, hermetically sealed, dehydrated air space.
    1. For use at interior glazing locations only. Not for use in glazing at exterior walls.

B. Spacer, Warm Edge: Silicone with integral desiccant and vapor barrier to provide a 1/2 inch thickness, hermetically sealed, dehydrated air space.

C. Sealing System: Dual seal, with polyisobutylene and polysulfide, polyisobutylene and silicone, or polyisobutylene and hot-melt butyl.

2.08 GLAZING SEALANT COMPOUNDS - NON-FIRE RATED

A. General:
    1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
    2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

B. Characteristics:
    1. Type: Single-component, non-sag, neutral-cure, medium modulus silicone sealant; meeting ASTM C920, Type S, Grade NS, Class 50, for Use NT, and ASTM 1184.

C. Products: Glazing Sealant - Silicone.
    1. Dowsil 795 Silicone Building Sealant or Dowsil 995 Silicone Structural Sealant.
        a. Dow Chemical Company,
    2. Pecora 895 NST Structural Silicone Glazing.
        a. Pecora Corporation. www.pecora.com
    3. Tremco Proglaze SSG, Structural Silicone Glazing.
        a. Tremco Sealants and Waterproofing by Tremco, Inc. www.tremcosealants.com

D. Accessories: Provide primers as required by adhesion testing, backer rod and accessories acceptable to sealant manufacturer.

2.09 GLAZING SEALANT COMPOUNDS - FIRE RATED

A. Glazing sealants for fire-rated glazing products: Products that are approved by testing agencies that listed and labeled fire-resistant glazing products with which they are used for applications and fire-protection ratings indicated.

2.10 GLAZING ACCESSORIES

A. Setting blocks for full rabbet glazing: Neoprene or EPDM, 70-90 Shore A durometer hardness, meeting ASTM C864.

B. Edge blocks for full rabbet glazing: Neoprene or EPDM, 60-70 Shore A durometer hardness, meeting ASTM C864.

C. Spacers for full rabbet glazing: Neoprene or EPDM, 40-50 Shore A durometer hardness, meeting ASTM C864.

D. Glazing gaskets: Premium quality sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers. Gaskets shall be as provided by framing system manufacturer to meet specified framing system performance criteria and framing system warranty requirements.

1. Dense compression gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from Silicone complying with ASTM C1115.

E. Lock-strip gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock-strips, complying with ASTM C542, black.

F. PVC foam tape for interior glazing: Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent, designed for compression of 25 percent to effect an air barrier and vapor retarder seal. Comply with ASTM D1667.

1. Manufacturers:
    a. Pecora Corporation: www.pecora.com.
    b. Saint-Gobain Performance Plastics: www.plastics.saint-gobain.com

G. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.

1. Width: As required for application.
2. Thickness: As required for application.
3. Spacer Rod Diameter: As required for application.
4. Manufacturers:
    a. Pecora Corporation: www.pecora.com.
    b. Tremco Global Sealants: www.tremcosealants.com.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.

B. Verify that the minimum required face and edge clearances are being provided.

C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

D. Verify that sealing between joints of glass framing members has been completed effectively.

E. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 PREPARATION

A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION, GENERAL

A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.

B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.

C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.

D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.

E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.

F. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

3.04 FIELD QUALITY CONTROL

A. Monitor and report installation procedures and unacceptable conditions.

3.05 CLEANING

A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.

B. Remove non-permanent labels immediately after glazing installation is complete.

C. Clean glass and adjacent surfaces after sealants are fully cured.

D. Clean glass on both exposed surfaces not more than 4 days prior to date of Substantial Completion in accordance with glass manufacturer's written recommendations.

3.06 PROTECTION

A. After installation, mark glass panes with an 'X' by using high visibility removable plastic tape or paste. Comply with glass manufacturer recommendations for suitable marking surfaces and materials.

B. Remove and replace glass that is damaged during construction period prior to date of Substantial Completion.

END OF SECTION

SECTION 08 9100

LOUVERS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Louvers, frames, and accessories.

B. Refer to project engineering Drawings and Specifications for additional coordination.

1.03 REFERENCES

A. Definitions:

1. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.
2. Horizontal Louver: Louver with horizontal blades (i.e., the axis of the blades are horizontal).
3. Vertical Louver: Louver with vertical blades (i.e., the axis of the blades are vertical).
4. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.
5. Wind-Driven-Rain-Resistant Louver: Louver that provides specified wind-driven-rain performance, as determined by testing according to AMCA 500-L.
6. "Dry Line" or "Wet-Dry Line": The location in the assembly and rough opening that creates a boundary and barrier to prevent water penetration from the exterior to the interior of the assembly and rough opening.
    a. The dry line extends from the adjacent wall assemblies across the rough opening and across the storefront assembly and is the location where water is not intended to pass beyond and if passage occurs, water cannot drain to the exterior. "Water" includes bulk water.
    b. "Dry Line" or "Wet-Dry Line" includes the location that the specific product, system, and/or material manufacturer has designed, engineered, manufactured, and/or fabricated their system to perform the defined wet-dry line role indicated.

B. Reference Standards:

1. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix).

2. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
3. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).
4. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
5. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
6. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
7. BS EN 12101-2 - Smoke and heat control systems Part 2: Specification for natural smoke and heat exhaust ventilators.
8. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating.
9. AMCA 511 - Certified Ratings Program for Air Control Devices.
10. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
11. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation to discuss conformance with project requirements, manufacturer installation requirements, affected adjacent materials and system, and site conditions.

B. Attendees shall include contractor, louver installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.

1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

C. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.

1. Show weep paths, gaskets, flashings, sealants, and other means of preventing water intrusion.
2. Show mullion profiles and locations.

3. Clearly identify the path of the "dry line" including continuous water and air barriers through and adjacent to the louver. Clearly identify the path, location, and continuity of all sealants and their connection to similar systems (i.e. continuous water, air, and thermal barrier) at the rough opening.

D. Product Test Reports: Based on evaluation of comprehensive tests performed according to AMCA 500-L by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver and showing compliance with performance requirements specified.

E. Color Charts: Provide manufacturer standard color charts for initial color selection.

F. Samples: Provide when requested by Architect for each type of metal finish required.

1.06 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements. Warranty shall be completed in Owner's name and registered with manufacturer.

C. Special Manufacturer Finish Warranty: Executed warranty meeting specified requirements.

D. Maintenance Data: Provide manufacturer maintenance instructions for the materials of this Section.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this Section, with minimum ten years of documented experience.

B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.08 FIELD CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.09 WARRANTY

A. Installer Special Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.

1. Warranty Period: One year from date of Substantial Completion.

B. Manufacturer Special Warranty: Manufacturer agrees to repair or replace louvers that do not comply with requirements or that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Connection failures of louver components.

b. Structural failures, including, but not limited to, excessive deflection.

c. Noise or vibration created by wind and thermal and structural movements.

d. Deterioration of metals and other materials beyond normal weathering.

e. Failure of operating components.

2. Warranty Period: Five years from date of Substantial Completion.

C. Manufacturer Special Finish Warranty, Factory-Painted Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of baked enamel, powder coat, or organic finishes within specified warranty period.

1. Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Delta E units when tested according to ASTM D2244.

b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.

c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Source Limitations: Obtain louvers from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

B. Basis of Design: Products by Greenheck Corporation; www.greenheck.com.

1. Final selection of aesthetic configuration shall be by Architect.

2. Refer to engineering Drawings and Specifications for size and ventilation requirements.

C. Acceptable Manufacturers: Subject to compliance with specified requirements.

1. Airolite Company, LLC. www.airolite.com.

2. Construction Specialties, Inc. www.c-sgroup.com.

3. Greenheck Corporation. www.greenheck.com.

4. Ruskin Company. www.ruskin.com

2.02 PERFORMANCE REQUIREMENTS

A. Louvers shall pass the following testing for HVHZ and high wind applications:

1. AMCA 540 Test Method for Louvers Impacted by Wind Borne Debris (Basic Protection, Missile D and Enhanced Protection, Missile E).

2. AMCA 550 High Velocity Wind Driven Rain.

3. Florida Test Protocol: TAS 201 Large (and small) Missile Impact.

4. Florida Test Protocol: TAS 202 Uniform Static Air Pressure.
5. Florida Test Protocol: TAS 203 Cyclic Wind Loading.

2.03 STATIONARY LOUVERS, GENERAL

A. Louvers: Horizontal blade, extruded aluminum construction, with intermediate mullions matching frame.

1. Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified in accordance with AMCA 511.
2. Design to allow maximum of 0.01 oz/sq ft (3.1 g/sq m) water penetration at calculated intake design velocity based on design air flow and actual free area.
3. Heads, sills, jambs and mullions to be one-piece structural aluminum members with integral caulking slot and retaining beads.
4. Drainable sightproof storm resistant fixed-blade designed to collect and drain water to exterior at sill by means of multiple gutters in blades and channels in jambs and mullions.
5. Louvers to be supplied with 4” (101.6mm) high by full depth sill flashings formed from minimum 0.050” (1.27mm) thick aluminum. Sill flashings to have welded side panels.
6. Face Flange Width: Minimum 2 inches, as indicated on drawings or as selected by Architect.
7. Include supports, anchorage, and accessories required for complete assembly.
8. Free Area: Refer to the requirements indicated by project mechanical design requirements.
9. Blades: Sight-proof, straight or V-shaped complying with specified performance requirements.
10. Frame Configuration: Corner joints mitered and, with continuous recessed caulking channel each side.
11. Louver Depth: Match depth of adjacent wall with corner joints mitered.

2.04 MATERIALS

A. Aluminum:

1. Aluminum Extrusions: ASTM B211, Alloy 6063-T5, 6063-T6 or 6061-T6.
2. Aluminum Sheet: ASTM B3209, Alloy 1100, 3003 or 5005.
3. Formed Aluminum: Formed sheet, ASTM B209/ASTM B209M.
4. Aluminum Thickness, Minimum: Frame 12 gage, 0.0808 inch (2.05 mm) minimum; blades 12 gage, 0.0808 inch (2.05 mm).

B. Steel:

1. Steel Sheet: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.

2. Steel Thickness, Galvanized: Frame 16 gage, 0.0598 inch (1.52 mm) minimum base metal; blades 16 gage, 0.0598 inch (1.52 mm) minimum base metal.

2.05 FINISHES, ALUMINUM - FACTORY PAINTED/PREFINISHED

A. General:

1. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
    a. Finish of all permanently exposed areas of aluminum components shall be applied in accordance with the appropriate AAMA Voluntary Guide Specification indicated.
2. Permanently Concealed Finishes: Factory mill finish. All other permanently exposed surfaces shall be factory painted/prefinished.

B. Permanently Exposed Finishes: Factory Painted/Pre-Finished. Provide one of the following.

1. FEVE Superior Performance Organic Powder Coating: Conforming to AAMA 2605 and as follows:
    a. Fluoroethylene vinyl ether (FEVE): Superior performance IFS 100% FEVE resin based fluoropolymer powder coated finish. Zero VOC formulation.
    b. Coats: Minimum one coat finish over aluminum with primer as required by coating manufacturer to comply with specified requirements
    c. Scratch resistance shall meet or exceed a pencil test of H in accordance with (ASTM D3363), “Standard Test Method for Film Hardness by Pencil Test”.
    d. Abrasion resistance shall meet or exceed a Taber abrasion test of 1000 rotations in accordance with (ASTM D4060), “Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser”.
2. PVDF (Polyvinylidene fluoride) Superior Performance Organic Multi-Coat System: Complying with AAMA 2605; and as follows:
    a. Including at least 70 percent PVDF, FSF-free resin, and having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch (0.030 mm).
    b. Coats: Minimum two coat finish with primer as required by coating manufacturer to comply with specified requirements.
    c. Finish Type: Arkema Group, Kynar 500, Sherwin Williams Fluropon, PPG Duranar, or Solvay Solexis, Inc., Hylar 5000 resin (Polyvinylidene fluoride, PVDF), formulated by a licensed manufacturer and applied by manufacturer's approved applicator to meet AAMA 2605.
3. Color: As selected by Architect from manufacturer full range of colors.
4. Touch-Up Materials: As recommended by finish manufacturer for field application.

2.06 ACCESSORIES

A. Blank-Off Panels: Provide blank-off panels where indicated. Material shall be 0.050 inch (1.27mm) thick aluminum sheet finished to match louver. Insulated in accordance with project exterior insulation requirements.

B. Screens: Unless otherwise indicated, all louvers to be furnished with mill finish bird and insect screens.

1. Screens to be aluminum open weave diagonal design mesh, 0.050" (1.27mm) thick expanded and flattened aluminum screen secured within 0.055" (1.40mm) thick extruded aluminum frames. Frames to have mitered corners and corner locks.

2. Secure screen frames to louver frames with stainless-steel machine screws, spaced a maximum of 6 inches (150 mm) from each corner and at 12 inches (300 mm) o.c. Frames shall be removable.

3. Screen Location for Fixed Louvers: Interior face.

4. Bird Screen: Interwoven wire mesh of aluminum, 14 gage, 0.0641 inch (1.63 mm) diameter wire, 1/2 inch (13 mm) open weave, diagonal design.

5. Insect Screen: 18 x 16 size aluminum mesh.

C. Fasteners and Anchors: Stainless steel.

D. Flashings: Of same material as louver frame, formed to required shape, single length in one piece per location.

1. Comply with requirements of Section 07 6200.

E. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type, continuously applied.

F. Bituminous Coating Paint: Cold-applied asphalt emulsion complying with ASTM D1187, minimum 30 mils dry film thickness per coat. Two coat application.

1. Use for separation of dissimilar metals and separation from concrete and masonry materials.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify prepared openings and flashings are ready to receive Work of this Section.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 INSTALLATION

A. General:

1. Install louver assembly in accordance with manufacturer's instructions.

2. Install flashings and align louver assembly to drain water to exterior. Coordinate with continuous air and water barrier assembly including wall drainage plane and through wall flashings.
3. Secure louver frames in openings with concealed fasteners. Ensure that securement is in compliance with applicable wind resistance requirements and as required for tamper proof installation.
4. Coordinate with installation of mechanical ductwork.
5. Install level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall and other adjacent construction.
6. Do not install damaged components.
7. Fit joints to produce hairline joints free of burrs and distortion.
8. Rigidly secure nonmovement joints.
9. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
10. Seal perimeter and other joints watertight unless otherwise indicated.
11. Seal perimeter and other joints airtight unless otherwise indicated.

B. Install bituminous paint for separation of dissimilar metals and separation from concrete and masonry materials. Minimum two coat application.

C. Sealants:
1. Install continuous internal sealants in locations recommended and required by louver assembly manufacturer.
2. Install sealants as required to maintain internal and external assembly dry line throughout the rough opening and louver assembly. Sealant installation shall be continuous in each location in order to provide watertight condition, except where weeps are indicated. Provide minimum three sealant locations within rough opening as follow, listed from interior to exterior.
3. Interior Air and Water Sealant Bead: Applied between the interior edge of the louver frame and in direct contact with the air and water barrier membrane flashing at the termination of the rough opening. Interior sealant joints shall be applied prior to interior finishes.
    a. Interior aesthetic sealant bead inboard of the interior air and water sealant bead: As indicated on Drawings at transitions between interior finishes for aesthetic purposes only. Coordinate with individual finish material specification requirements and the requirements of Section 07 9200 - Joint Sealants.
4. Primary Air and Water Sealant Bead: The primary backer rod and sealant shall be applied between the outside frame and in direct contact with the membrane flashing in the rough opening.
5. Exterior, Secondary Water Barrier Sealant Bead: The exterior secondary sealant beach shall be installed between the louver assembly and the building exterior wall cladding

system finishes. This layer of sealant protects bulk water from getting to the primary seal. Do not block louver sill assemblies or weepholes with sealant.

6. All sealant installations shall be tooled for smooth transition and in shape to drain water to lower drainage points in assembly.

3.03 PROTECTION

A. Protect installed materials to prevent damage by other trades. Use materials that may be easily removed without leaving residue or permanent stains.

3.04 CLEANING

A. Strip protective finish coverings.

B. Clean surfaces and components.

1. Immediately clean exposed surfaces of the louvers to remove fingerprints and dirt accumulation during the installation process. Do not let soiling remain until the final cleaning.

2. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to the material finishes. Thoroughly rinse surfaces and dry.

C. Restore louvers and accessory components damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by the Architect, remove damaged materials and replace with new materials.

D. Touch up minor abrasions in finishes with a compatible air-dried coating that matches the color and gloss of the factory applied coating.

END OF SECTION

SECTION 09 0561

MOISTURE VAPOR CONTROL FLOOR-WALL PREPARATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Substrate preparation for interior materials to be installed over substrates for flooring installation.
   1. For use where substrate flatness and moisture levels are not within allowable ranges at the time of flooring installation.
   2. For use in conjunction with material manufacturer recommendations and requirements.

B. Work of this Section includes:
   1. Substrate leveling materials.
   2. Fluid-applied, resin-based, membrane-forming systems that control the moisture-vapor-emission rate of high-moisture, interior concrete in preparation for floor covering installation.
   3. Preparation of concrete for installation of material coverings.
   4. Testing of concrete for moisture and alkalinity (pH).
   5. Remediation of concrete due to unsatisfactory moisture or alkalinity (pH) conditions.

1.03 REFERENCE STANDARDS

A. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens).

B. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

C. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

D. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.

1.04 DEFINITIONS

A. MVE: Moisture vapor emission.

B. MVER: Moisture vapor emission rate.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate scheduling of cleaning and testing, so that preliminary cleaning has been completed for at least 24 hours prior to testing.
2. Coordinate and comply with the requirements of individual material coverings specified for use on this project.

B. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation to discuss conformance with project requirements, manufacturer installation requirements, affected adjacent materials and system, and site conditions.

1. Attendees shall include contractor, flooring installer, MVE installer, floor leveling material installer, subfloor installer, and installers of adjacent materials and systems.
2. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.06 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Material and Adhesive Manufacturers' Product Literature: For each specific combination of substrate, material covering, and adhesive to be used.

1. Include moisture and alkalinity (pH) limits and test methods.
2. Include manufacturer's recommended or required bond and compatibility test procedure.

C. Testing Agency's Report:

1. Description of areas tested; include floor plans and room designations matching those used on project architectural drawings.
2. Summary of conditions encountered.
3. Moisture and alkalinity (pH) test reports (results).
4. Copies of specified test methods.
5. Recommendations for remediation of unsatisfactory surfaces.
6. Submit report to Architect.
7. Submit report not more than two business days after conclusion of testing.

D. Adhesive Bond and Compatibility Test Report.

E. Remedial Materials Product Data: Manufacturer's published data on each product to be used for remediation of substrates that do not meet requirements.

1. Manufacturer's qualification statement.
2. Manufacturer's statement of compatibility with types of material to be applied over remedial products.

3. Test reports indicating compliance with specified performance requirements, performed by nationally recognized independent testing agency.
4. Manufacturer's installation instructions for each type of product.
5. Specimen Warranty: Copy of warranty to be issued by remedial product manufacturer meeting the requirements of this project.

F. Qualification Data: For Installer.

G. Field quality-control reports.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: Employs factory-trained personnel who are available for consultation and Project-site inspection.

B. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

C. Testing Agency Qualifications: Independent testing agency experienced in the types of testing specified.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating directions for storage and mixing with other components.

1.09 FIELD CONDITIONS

A. Environmental Limitations: Comply with MVE-control system manufacturer's written instructions for substrate and ambient temperatures, humidity, ventilation, and other conditions affecting system installation.

B. Store system components in a temperature-controlled environment and protected from weather and at ambient temperature as recommended by manufacturer but not less than 65 deg F (18 deg C) and not more than 85 deg F (29.4 deg C) at least 48 hours before use.

C. Maintain ambient temperature and relative humidity in installation areas within range recommended in writing by MVE-control system manufacturer, but not less than 65 deg F (18 deg C) or more than 85 deg F (29.4 deg C) and not less than 40 or more than 60 percent relative humidity, for 48 hours before installation, during installation, and for 48 hours after installation unless longer period is recommended in writing by manufacturer.

D. Install MVE-control systems where concrete surface temperatures will remain within manufacturer recommendations but at a minimum of 5 deg F (3 deg C) higher than the dew point for ambient temperature and relative humidity conditions in installation areas for 48 hours before installation, during installation, and for 48 hours after installation unless longer period is recommended in writing by manufacturer.

1.10 WARRANTY

A. Special Manufacturer Warranty: MVE-control system manufacturer's warranty in which manufacturer agrees to repair or replace systems where products fail to perform as designed and manufactured due to manufacturing and material defects manufactured.

1. Terms: 10-years, non-prorated, covering materials and labor.

B. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. MVE-Control System Capabilities: Capable of suppressing MVE without failure where installed on concrete that exhibits the following conditions:

1. MVER: In compliance with ASTM F1869 and as required or recommended by material system manufacturer for covering system to be installed.

B. Water-Vapor Transmission: Through MVE-control system, in compliance with ASTM E96/E96M and as required by material covering manufacturer for system to be installed.

C. Tensile Bond Strength: For MVE-control system, greater than 200 psi with failure in the concrete according to ASTM D7234.

2.02 MVE-CONTROL SYSTEM

A. MVE-Control System: ASTM F3010-qualified, fluid-applied, two-component, epoxy-resin, membrane-forming system; formulated for application on concrete substrates to reduce MVER to level required for installation of material coverings indicated and acceptable to manufacturers of material covering products indicated, including adhesives.

1. Substrate Primer: Provide MVE-control system manufacturer's concrete-substrate primer if required for system indicated by substrate conditions.

B. Basis of Design: CustomTech TechMVC Moisture Vapor and Alkalinity Barrier by Custom Building Products, Inc. www.custombuildingproducts.com

C. Acceptable Manufacturers:

1. Any product and manufacturer recommended by material wall or floor covering manufacturer.
2. Ardex Americas, Inc. www.ardexamericas.com
3. Custom Building Products, Inc. www.custombuildingproducts.com
4. Laticrete, Inc. www.laticrete.com

D. Moisture Barrier/Vapor Retarder Membrane : Single coat, high density, moisture and alkali resistant, two-component, solvent free, rapid cure 100% solids epoxy coating specifically formulated to control concrete moisture vapor emission and alkalinity beneath finished flooring or wall material installations.

1. Water Vapor Transmission (10 mil film): ASTM E96 0.085 net perms.
2. Alkaline Resistance, pH 14, 10 days ASTM D1308: No effects.
3. Tensile Pull on damp concrete ASTM D7234: Failure in concrete substrate (>400 psi).
4. VOC, g/l per ASTM D2369 SCAQMD Rule 1113: 24.

E. Prior to installation, coordinate with specific material system manufacturer recommendations and provide moisture vapor control material that is acceptable to floor or wall covering material manufacturer for use on this project.

2.03 ACCESSORIES

A. Patching and Leveling Material: Moisture, mildew, and alkali-resistant product with minimum of 3000-psi 20.68-MPa compressive strength after 28 days when tested according to ASTM C109/C109M.

1. Product as provided by, or as recommended in writing by MVE-control system manufacturer for project specific application.

B. Crack-Filling Material: Resin-based material for sealing concrete substrate crack repair.

1. Product as provided by, or as recommended in writing by MVE-control system manufacturer for project specific application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for maximum moisture content, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 PREPARATION

A. Preinstallation Testing:

1. Testing Agency: Contractor to engage a qualified testing agency to perform tests.
2. Alkalinity Testing: Perform pH testing according to ASTM F710. Install MVE-control system in areas where pH readings are not within material covering manufacturer range.

3. Moisture Testing: Perform tests so that each test area does not exceed floor or wall material covering manufacturer recommendations. Maximum test area shall be 200 sq. ft. (18.6 sq. m), and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
4. Anhydrous Calcium Chloride Test: ASTM F1869. Install MVE-control system in locations where concrete substrate MVER exceeds floor or wall material covering manufacturer recommendation. Maximum allowable rate is 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
5. Internal Relative Humidity Test: Using in situ probes, ASTM F2170. Install MVE-control system in locations where concrete substrates exhibit relative humidity level greater than floor or wall material covering manufacturer recommendation.
6. Tensile-Bond-Strength Testing: For typical locations indicated to receive installation of MVE-control system, install minimum 100-sq. ft. (9.29-sq. m) area of MVE-control system to prepared concrete substrate and test according to ASTM D7234.
    a. Proceed with installation only where tensile bond strength is greater than 200 psi (1.38 MPa) with failure in the concrete.

B. Concrete Substrates: Prepare and clean substrates according to MVE-control system manufacturer's written instructions to ensure adhesion of system to concrete.
1. Remove coatings and other substances that are incompatible with MVE-control system and that contain soap, wax, oil, or silicone, using mechanical methods recommended in writing by MVE-control system manufacturer. Do not use solvents.
2. Provide concrete surface profile complying with system manufacturer written instructions.
3. Protect substrate voids and joints to prevent resins from flowing into or leaking through them.
4. Fill surface depressions and irregularities with patching and leveling material.
5. Fill surface cracks, grooves, control joints, and other nonmoving joints with crack-filling material.
6. Allow concrete to dry, undisturbed, for period recommended in writing by MVE-control system manufacturer after surface preparation, but not less than 24 hours.
7. Before installing MVE-control systems, broom sweep and vacuum prepared concrete. Clean as recommended by system manufacturer.

C. Protect adjacent surfaces including but not limited to walls, floor openings, electrical openings, door frames, and other obstructions during installation.

3.03 INSTALLATION

A. Install MVE-control system according to ASTM F3010 and manufacturer's written instructions to produce a uniform, monolithic surface free of surface deficiencies such as pin holes, fish eyes, and voids.

1. Install primers as required to comply with manufacturer's written instructions and recommendations.

B. Do not apply MVE-control system across substrate expansion, isolation, and other moving joints.

C. Apply system, including component coats if any, in thickness recommended in writing by MVE-control system manufacturer for MVER indicated by preinstallation testing.

D. Cure MVE-control system components according to manufacturer's written instructions. Prevent contamination or other damage during installation and curing processes.

E. After curing, examine MVE-control system for surface deficiencies. Repair surface deficiencies according to manufacturer's written instructions.

3.04 FIELD QUALITY CONTROL

A. Testing Agency: Contractor to engage a qualified testing agency to perform installation inspections.

B. Installation Inspections: Inspect substrate preparation and installation of system components to ensure compliance with manufacturer's written instructions and to ensure that a complete MVE-control system is installed without deficiencies.

1. Verify that surface preparation meets requirements.
2. Verify that component coats and complete MVE-control-system film thicknesses comply with manufacturer's written instructions.
3. Verify that MVE-control-system components and installation areas that evidence deficiencies are repaired according to manufacturer's written instructions.

C. MVE-control system will be considered defective if it does not pass inspections.

3.05 PROTECTION

A. Protect MVE-control system from damage, wear, dirt, dust, and other contaminants before floor covering installation. Use protective methods and materials, including temporary coverings, recommended in writing by MVE-control system manufacturer.

B. Do not allow subsequent preinstallation examination and testing for floor or wall material covering installation to damage, puncture, or otherwise compromise the MVE-control system membrane.

END OF SECTION

SECTION 09 2116

GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Gypsum board for interior assemblies, including accessories, and joint treatments.

B. For exterior wall system gypsum board sheathing refer to Section 06 1645.

1.03 RELATED REQUIREMENTS

A. Refer to 05 5400 - Cold-Formed Metal Framing, for structural non-load-bearing metal framing that does not exceed height and load limitations of standard, nonstructural metal framing.

B. Refer to Section 05 5000 - Metal Fabrications, for miscellaneous steel shapes, masonry shelf angles, and connections used with cold-formed metal framing.

C. Refer to Section 09 2216 - Non-Structural Metal Framing for the following:

1. Exterior non-structural, load bearing metal framing.
2. Interior non-structural, load bearing and non-load bearing metal framing.
3. Interior non-structural metal framing that does not exceed manufacturer standard height or load limitations of standard, non-structural metal framing.

D. Refer to Section 05 4000 - Cold Formed Metal Framing.

1. Structural load bearing metal framing, exterior and interior applications.
2. Interior non-structural, load-bearing metal framing that exceeds manufacturer standard height and load limitations of standard, non-structural metal framing.

1.04 REFERENCES

A. Definitions:

1. Structural Metal Framing: Metal framing intended to support building structural loads at interior and exterior locations in addition to gypsum, wood, or other sheathing boards.
2. Load Bearing Metal Framing: Metal framing intended to support non-structural loads in addition to gypsum, wood, or other sheathing boards including, but not limited to, wall or ceiling mounted items.

3. Non-Load Bearing Metal Framing: Metal framing intended to support only gypsum, wood, or other sheathing boards.
4. Metal Framing: Miscellaneous cold formed steel framing shapes used for support of wall and ceiling assemblies.
5. Sheathing: Boards used as final wall cladding material to be field finished, or as substrate for wall coverings.

B. Reference Standards:
1. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
2. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board.
3. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
4. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
5. GA-216 - Application and Finishing of Gypsum Panel Products.
6. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
7. UL (FRD) - Fire Resistance Directory; Current Edition.

1.05 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

B. Attendees shall include contractor, gypsum board assemblies installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.06 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Provide data on gypsum board, accessories, fastener, penetration, transition, and joint finishing.

C. Shop Drawings:
1. Provide dimensioned plans indicating location and configuration of penetrations at rated wall and ceiling assemblies. Indicate compliance with rating requirements.
2. Indicate special details including rated assembly seals.
3. Indicate each fastener/anchor type proposed for use at each type of project substrate.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this Section, and proposed for use, with minimum 15 years of documented experience.

B. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum 5 years of experience.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original containers, dry and undamaged, with seals and labels intact.

B. Store materials in weather protected environment, clear of ground and moisture.

C. Comply with recommendations and requirements of material manufacturer.

1.09 FIELD CONDITIONS

A. Protection of Stored Materials: The following are prohibited at on-site stored material locations:

B. Do not place materials, tools, equipment, boxes, drawings, personal items, and other objects on front or back side of gypsum board stored on-site at any time.

C. Do not sit, rest, recline, or stand on front or back side of gypsum board stored on-site at any time.

1.10 WARRANTY

A. Special Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, where items fail to perform as designed and manufactured.

1. Warranty Period: Provide manufacturer standard warranty.

B. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.

1. Warranty Period: One year from date of Substantial Completion.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS, GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.

B. Fire Rated Assemblies:

1. ICC-IBC Item Numbers: Comply with requirements of applicable code for the particular assembly.

2. Gypsum Association File Numbers: Comply with requirements of GA-600 for the particular assembly.
3. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL (FRD).

C. Sound-rated Assemblies:
1. Provide materials and construction identical to those tested in assemblies indicated, in accordance with ASTM E90 and classified in accordance with ASTM E413 by an independent Testing Agency.
2. Construct designated partitions in accord with manufacturer's product data, as submitted, for obtaining Sound Transmission Class (STC) ratings as indicated on Drawings, in accordance with ASTM E90.

D. Metal Framing and Accessories: Provide in accordance with applicable metal framing Section for this Project.

2.02 BOARD MATERIALS

A. Gypsum Board: Typical interior wall and ceiling applications.
1. Characteristics: Paper faced board for interior applications.
a. Thickness: 5/8" thickness Type C or Type X Grade fire-rated board, tapered edges.
b. Description: Gypsum core encased in facers, with tapered long edges and complying with ASTM C1396.
c. Joint tape: As recommended by gypsum board manufacturer.
d. Limitations: Do not use as a tile backer board.
2. Applications:
a. Interior Wall Board: 5/8" thickness, tapered edges.
b. Fire-Retardant Board: Type C or Type X as scheduled on the drawings, 5/8" thickness, tapered edges.
c. Interior Ceiling Board: 5/8" thickness, tapered edges.
d. Flexible Gypsum Board: 1/4 inch thick, tapered edges, manufactured with flexibility to bend to fit radii for project specific curved applications.
3. Acceptable Products: Subject to compliance with requirements.
a. American Gypsum, ClassicRoc Gypsum Board. www.americangypsum.com
b. CertainTeed, Regular Drywall Gypsum Board. www.certainteed.com
c. Georgia-Pacific, ToughRock Gypsum Board. www.buildgp.com
d. National Gypsum, GoldBond Gypsum Board. www.goldbondbuilding.com
e. USG Corporation, USG Sheetrock Brand. www.usg.com

B. Gypsum Board: Interior wall and ceiling locations subject to humidity. Not for tile backing or wet locations

1. Characteristics: Mold and moisture resistant, treated paper faced board for interior applications.
    a. Thickness: 5/8" thickness Type C or Type X Grade fire-rated board, tapered edges.
    b. Description: Mold and moisture resistant gypsum core encased in mold and moisture resistant facers, with tapered long edges and complying with ASTM C1396.
    c. Mold resistance: Resistant to mold growth when tested in accordance with ASTM D3273, score of 10.
    d. Water absorption: Less than 5% of board weight when tested in accordance with ASTM C473.
    e. Joint tape: As recommended by gypsum board manufacturer.
    f. Limitations: Do not use as a tile backer board.
2. Applications:
    a. Interior Wall Board: 5/8" thickness, tapered edges.
    b. Fire-Retardant Board: Type C or Type X as scheduled on the drawings, 5/8" thickness, tapered edges.
    c. Interior Ceiling Board: 5/8" thickness, tapered edges.
    d. Flexible Gypsum Board: 1/4 inch thick, tapered edges, manufactured with flexibility to bend to fit radii for project specific applications.
3. Acceptable Products: Subject to compliance with requirements.
    a. American Gypsum, M-Bloc Gypsum Board. www.americangypsum.com
    b. CertainTeed, M2Tech Moisture & Mold Resistant Gypsum Board. www.certainteed.com
    c. Georgia-Pacific, ToughRock Mold-Guard Gypsum Board. www.buildgp.com
    d. National Gypsum, GoldBond XP Gypsum Board. www.goldbondbuilding.com
    e. USG Corporation, USG Sheetrock Brand Mold Tough. www.usg.com

C. Impact Resistant Board: Designed to resist surface abrasion and indentation with increased resistance to impact.
1. For use in locations subject to increased usage with higher likelihood of impact from activity within the space.
2. For use in the following locations:
    a. Corridors.
    b. Lobbies.
    c. Mechanical, electrical, plumbing, and IT rooms; as applicable.
    d. Storage rooms.
    e. Closets.
    f. Security equipment rooms.

g. Additional locations indicated on Drawings.

3. Acceptable Products: Subject to compliance with requirements.
   a. American Gypsum, M-Bloc (IR) Impact Resistant Type X Gypsum Board.
   b. CertainTeed, AirRenew Extreme Impact Resistant Gypsum board.
   c. Georgia-Pacific, DensArmor Plus Fireguard Impact Resistant Interior Gypsum Board.
   d. National Gypsum Co., Gold Bond Hi-Impact XP Gypsum Board.
   e. USG Corporation, USG Sheetrock Board Mold Tough VHI.
4. Characteristics:
   a. Limitations: Do not use as a base for wall tile installation. Do not use in wet areas.
   b. Description: Fiber-reinforced or glass mesh enhanced core gypsum board meeting ASTM C1396; minimum Type C or Type X fire resistance rated.
   c. Thickness: 5/8".
   d. Abrasion resistance: Surface abrasion depth shall be maximum 0.059" when tested in accord with ASTM D4977; or achieve minimum Level 3 abrasion resistance when tested in accord with ASTM C1629.
   e. Surface indentation: Surface indentation shall be maximum 0.100" when tested in accord with ASTM D5420; or achieve minimum Level 1 indentation resistance when tested in accord with ASTM C1629.
   f. Soft body impact: Minimum 300 ft.-lbs. to failure for single drop when tested in accord with ASTM E695; or achieve minimum Level 3 soft body impact resistance when tested in accord with ASTM C1629.
   g. Hard body impact: Minimum 150 ft.-lbs. to failure and achieve minimum Level 3 hard body impact resistance when tested in accord with ASTM C1629.
   h. Fire resistance: Noncombustible, minimum Type X, meeting UL minimum one-hour fire resistance, meeting ASTM E136 and ASTM E84; flame spread rating of 15 maximum and smoke developed rating of 0.
   i. Mold resistance: Resistant to mold growth when tested in accord with ASTM D3273, score of 10.

D. Tile Backer Board: Cementitious backer board.
1. Coordinate with requirements of Section 09 3000 - Tiling.
2. Cementitious type complying with ANSI A118.9; high density, glass fiber reinforced, 1/2 inch (12.7 mm) thick; 2 inch (51 mm) wide coated glass fiber tape for joints and corners.
3. Basis of Design: Custom Building Products; WonderBoard Lite Backerboard: www.custombuildingproducts.com.
4. Acceptable Products: Subject to compliance with requirements.
   a. USG Durock with EdgeGuard. www.usg.com

b. James Hardie Building Products; Hardie Backer Board. www.jameshardie.com

c. National Gypsum Company, Gold Bond ExP Tile Backer Board. www.goldbondbuilding.com

E. Tile Backer Board: Gypsum based, water-resistant, coated glass mat backer board.

1. Coordinate with requirements of Section 09 3000 - Tiling.

2. Acceptable products: Subject to compliance with requirements.

a. CertainTeed, Diamondback GlasRoc Tile Backer.

b. G-P Gypsum Products, Dens-Shield Fireguard Tile Backer.

c. National Gypsum Co., Gold Bond eXP Tile Backer.

3. Characteristics: Meeting ASTM C1178, minimum 5/8" thickness Type C or Type X, water-resistant gypsum core, fiberglass surface mats, front and back, coated with water and vapor retardant coating.

4. Mold resistance: Tested in accord with ASTM D3273, score of 10, as rated in accord with ASTM D3274.

5. Joint tape: Fiberglass mesh joint tape as recommended by gypsum board manufacturer.

F. Backer Board for Reinforced Protective Plastic Wallcovering: For use with fiberglass reinforced panel (FRP) applications. Coordinate with FRP manufacturer recommendations. Refer to Section 09 7900 - Protective Plastic Wallcovering.

1. Acceptable products: Subject to compliance with requirements.

a. CertainTeed, Diamondback GlasRoc Tile Backer.

b. G-P Gypsum Products, Dens-Shield Fireguard Tile Backer.

c. National Gypsum Co., Gold Bond eXP Tile Backer.

2. Characteristics: Meeting ASTM C1178, minimum 5/8" thickness Type C or Type X, water-resistant gypsum core, fiberglass surface mats, front and back, coated with water and vapor retardant coating.

3. Mold resistance: Tested in accord with ASTM D3273, score of 10, as rated in accord with ASTM D3274.

4. Joint tape: Fiberglass mesh joint tape as recommended by gypsum board manufacturer.

2.03 MISCELLANEOUS INSTALLATION ACCESSORIES, GENERAL

A. Accessories shall comply with ASTM C1047.

B. Wall Mounted Deflection Beads: Flexible gasket and bead with 1-1/8 inch (29 mm) flange.

C. Control joints: Control joint shall be designed to be applied after wall board is installed. Expanded metal or perforated flanges shall accept joint compound for a flush finish. Control joints shall provide stress relief and shall assist in controlling cracking in large areas of wallboard.

D. Exterior Soffit Vents: One piece, perforated, ASTM B221 6063 T5 alloy aluminum, with edge suitable for direct application to gypsum board and manufactured especially for soffit application. Provide venting as indicated on Drawings and complying with project requirements.

2.04 MISCELLANEOUS INSTALLATION ACCESSORIES, METAL SUBSTRATES

A. Accessories shall comply with ASTM C1047.

B. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch (0.84 mm) in Thickness: ASTM C1002; self-piercing tapping screws, corrosion resistant.

C. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch (0.84 to 2.84 mm) in Thickness: ASTM C954; steel drill screws, corrosion resistant.

D. Screws for Tile Backer Board: Corrosion resistant sheet metal screws with head diameter providing 125 lb. fastener pull-through and pull-out resistance. Screw length shall provide 1/4" minimum thread engagement.

2.05 MISCELLANEOUS INSTALLATION ACCESSORIES, WOOD SUBSTRATES

A. Screws for Fastening of Gypsum Panel Products to Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.

B. Screws for Tile Backer Board: Corrosion resistant self-piercing tapping screws screws with head diameter providing 125 lb. fastener pull-through and pull-out resistance. Screw length shall provide 1/4" minimum thread engagement.

C. Adhesive for Attachment to Wood per ASTM C557. Both screws and adhesive are required in all locations.

1. Franklin International, Inc; Titebond PROvantage Professional Drywall Adhesive: www.titebond.com.
2. Liquid Nails, a brand of PPG Design Architectural Coatings; DWP-24 Drywall Construction Adhesive: www.liquidnails.com.

2.06 ACOUSTICAL SOUND CONTROL ACCESSORIES

A. Fiberglass Batts and Blankets for Sound-Attenuation: ASTM C665, Type I (without facing) fiberglass insulation..

1. Thickness: Minimum thickness shall be a required to match stud cavity (web) width, including, but not limited to, the following nominal requirements.
   a. Provide 6-inch sound batts in 6-inch stud walls. Set metal stud runners in continuous bead of sound control sealant.
   b. Provide 3-1/2 inch sound batts in 3-5/8 inch stud walls. Set metal stud runners in continuous bead of sound control sealant.
2. Acceptable Products: Subject to compliance with requirements.

a. InsulPure by CertainTeed, a business unit of Saint Gobain. www.certainteed.com

b. Ecobatt by Knauf Insulation. www.knaufnorthamerica.com

c. JM Formaldehyde-Free Fiberglass Insulation by Johns Manville, a Berkshire Hathaway Company. www.jm.com

d. Pink Next Gen Sound Attenuation Batts by Owens-Corning Corp. www.owenscorning.com

3. Characteristics:

a. Type: Unfaced fiberglass batts for friction fit or stapled/supported installation between studs, complying with ASTM C665, Type 1.

b. Surface burning characteristics: Maximum 25 flame spread and 50 smoke development when tested in accord with ASTM E84.

c. Formaldehyde-free.

d. Assembly STC: As indicated on Drawings.

B. Mineral Wool Sound Attenuation Batts and Blankets: ASTM C553, Type I through IV, unfaced, manufactured from thermosetting resins , and mineral fibers manufactured from basalt (volcanic rock).

1. Thickness: Minimum thickness shall be a required to match stud cavity (web) width, including, but not limited to, the following nominal requirements.

a. Provide 6-inch sound batts in 6-inch stud walls. Set metal stud runners in continuous bead of sound control sealant.

b. Provide 3-1/2 inch sound batts in 3-5/8 inch stud walls. Set metal stud runners in continuous bead of sound control sealant.

2. Acceptable Products: Subject to compliance with requirements.

a. MinWool 1200 Flexible Batt Insulation by Johns Manville, a Berkshire Hathaway Company. www.jm.com

b. Rockwool by Roxul, Inc. www.rockwool.com

c. Thermafiber SAFB by Owens-Corning Corp. www.owenscorning.com

3. Characteristics:

a. Type: Paperless, unfaced, semi-rigid mineral wool fiber batt/blanket

b. Surface burning characteristics: Maximum 0 flame spread and 0 smoke development when tested in accordance with ASTM E84.

c. Formaldehyde-free.

d. Assembly STC: As indicated on Drawings.

C. Acoustical Sealants for Permanently Exposed Joints: Paintable.

1. Provide acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies according to ASTM E90.

2. Manufacturer's standard paintable, single component (one part), nonsag, nonstaining, nonmigrating, latex based acoustical sealant.
3. Meets or exceeds the following specifications: UL 1479, UL 2079, ASTM E834, ASTM C919, ASTM E84, ASTM E90, flame spread-5, smoke developed-5.
    a. Designed to achieve a minimum Sound Transmission Class (STC) of 53 when applied in accordance with ASTM C919 - Standard Practice for use of Sealants in Acoustical Applications, with installation intended as two beads of sealant at the top, bottom and all perimeter edges.
4. Acceptable Products: Subject to compliance with requirements.
    a. BOSS 826 Acoustical Sound Sealant by Boss Products, a brand of Accumetric, LLC. www.accumetricinc.
    b. Acoustical Sealant GSC or GSCF by Grabber Construction Products. www.grabberpro.com
    c. OSI SC175 Acoustical Sound Sealant by OSI, a brand of the Henkel Corporation. www.ositough.com
    d. AIS-919 Acoustical and Insulation Latex Sealant by Pecora Corporation. www.pecora.com
5. Color: Manufacturer standard white for field painting.

D. Acoustical Sealant for Permanently Concealed Joints: Non-paintable.
1. Provide acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies according to ASTM E90.
2. Manufacturer's standard nonsag, nondrying, nonhardening, nonskinning, nonstaining, gunnable, acoustical sealant.
3. Meets or exceeds the following specifications: UL 1479, UL 2079, ASTM E834, ASTM C919, ASTM E84, ASTM E90, flame spread-5, smoke developed-5.
    a. Designed to achieve a minimum Sound Transmission Class (STC) of 62 when applied in accordance with ASTM C919 - Standard Practice for use of Sealants in Acoustical Applications, with installation intended as two beads of sealant at the top, bottom and all perimeter edges.
4. Acceptable Products: Subject to compliance with requirements.
    a. BA-98 Sealant by Pecora Corporation. www.pecora.com
    b. Quiet Seal Pro by Pabco Gypsum. www.pabcogypsum.com
    c. Sheetrock Acoustical Sealant by USG Corporation. www.usg.com
5. Color: Manufacturer standard white or gray.

E. Acoustical Putty: Moldable, acoustical putty. For intumescent applications, refer to Section 07 8400 - Firestopping.
1. UL Classified, odorless, and water resistant.

2. Designed for use as sound insulation product with adhesion to typical substrate materials found on this project.
3. Non-hardening, permanently resilient.
4. In Service Temperature: -10 deg. F to 120 deg. F.
5. Meets or exceeds the following specifications: UL 1479, UL 2079, ASTM E834, ASTM C919, ASTM E84, ASTM E90, flame spread-5, smoke developed-5.
    a. Designed to achieve a minimum Sound Transmission Class (STC) of 62 when applied in accordance with ASTM C919 - Standard Practice for use of Sealants in Acoustical Applications, with installation intended as two beads of sealant at the top, bottom and all perimeter edges.
6. Acceptable Manufacturers: Subject to compliance with requirements.
    a. Acoustigard Sound and Vibration Control. www.acoustiguard.com
    b. Acoustical Solutions. www.acousticallsolutions.com
    c. Hilti North America. www.hilti.com
    d. Kinetics Noise Control. www.kineticsnoise.com
    e. Soundaway Corporation. www.soundaway.com
    f. Quiet Putty 380 by Pabco Gypsum. www.pabcogypsum.com

F. Acoustical Sealant Tape: Closed cell polyvinyl chloride foam tape.
1. Size: Minimum 1/4 inch thick by 1 inch wide. Size to fit application, trim as necessary.
2. Color: Colors as selected by Architect from manufacturer's full range of colors.
3. Products: Subject to compliance with requirements.
    a. Saint-Gobain Performance Plastics, Inc. Norseal V730. www.plastics.saint-gobain.com
    b. Soundaway Corporation, Inc. Neoprene Isolation Gasket PSA. www.soundaway.com
    c. Foamtapes.net, a division of LAMATEK, Inc. Foamtapes PolyVinyl Chloride (PVC) Foam 7 lb. www.foamtapes.net

2.07 GYPSUM BOARD FINISHING ACCESSORIES

A. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.
1. Fiberglass Tape: 2 inch (50 mm) wide, coated glass fiber tape for joints and corners.
2. Paper Tape: 2 inch (50 mm) wide, creased paper tape for joints and corners.
3. Joint Compound: Drying type, vinyl-based, ready-mixed.

B. Finishing Compound: Surface coat and primer.

C. High Build Drywall Surfacer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish.

D. Textured Finish Materials: Latex-based compound.

2.08 MISCELLANEOUS TRIM ACCESSORIES

A. Accessories shall comply with ASTM C1047 or ASTM D3678.

B. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.

1. Acceptable Plastic Trim Manufacturers:

a. Plastic Components, Inc.

b. Trim-Tex Drywall components.

c. Vinyl corp.

C. Corner Beads:

1. Inside corners: 1-1/4 inch wide expanded metal or fine perforated flanges.

a. For use in all locations, unless indicated otherwise.

2. Square Outside Corners: Square with 1-1/4 inch wide expanded metal or fine perforated flanges.

a. For use in all locations, unless indicated otherwise.

3. Bullnose Outside corners: 3/8 inch radius bullnose corner bead reinforcement, nail or staple-on type.

a. For use only where indicated or where selected by Architect.

D. Jamb, Ceiling and Casing Trim: Manufacturer's standard "L" and "U" shaped members with expanded metal or perforated flanges; "mud-in" type for finishing with joint compound.

2.09 REVEALS

A. For use only in locations indicated on Drawings.

B. Design Architectural Reveal: Standard.

1. Size: 1/2 inch wide by 1/2 inch deep, unless noted otherwise.

2. Pre-fabricated reveal with pre-fabricated intersections and corners.

3. Material: Extruded alloy 6063-T5, with chemical conversion coating, primed finish, clear anodized or other specified finish.

4. Finish: Factory primed for field painting. Refer to Section 09 9000 - Painting and Coating.

5. Products: Subject to compliance with requirements.

a. Drywall Reveal Molding by Fry Reglet Corp. www.fryreglet.com

b. Architectural AS Reveal Bead by Trim-Tex Design . www.trim-tex.com

C. Other reveal sizes and configurations:

1. Basis of Design: Products by Fry Reglet Corp. www.fryreglet.com

2.10 DISSIMILAR MATERIAL PROTECTION

A. Bituminous Paint/Coating: Refer to Section 07 1115 - Protective Bituminous Paint Coating.
   1. Coordinate with requirements of product/material manufacturer(s) of this Section.
   2. For use as corrosion protection between dissimilar materials.
   3. Apply in two coats for full coverage minimum 30 dry mil thickness, unless indicated otherwise.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this Section to commence.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 METAL FRAMING, SUPPORT, AND BACKING INSTALLATION, GENERAL

A. Metal Framing and supports: Install in accordance with project requirements including applicable metal framing specification Section.
   1. Anchor framing using appropriate power-driven fasteners at not more than 24 inches on center.
   2. Install studs at spacing required to meet performance requirements.
   3. On walls over sixteen feet high, screw-attach studs to runners top and bottom.

B. Backings for Support: Provide and install backing and support required for installation of gypsum board assemblies and wall mounted items. Coordinate with project rough carpentry and metal fabrication Sections.

3.03 GYPSUM BOARD ASSEMBLY INSTALLATION, GENERAL

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints.

B. Acoustical and Sound-Rated Construction: Install in strict compliance with requirements of assembly listing.
   1. Install sealants and other acoustic control materials at all acoustical and sound rated assemblies as required to maintain required rating.

C. Fire-Rated Construction: Install in strict compliance with requirements of assembly listing.

3.04 TILE BACKING PANEL INSTALLATION

A. Refer to the requirements of Section 09 3000 - Tiling.

B. Fill and finish joints and corners of cementitious backing board as recommended by manufacturer.

C. Where tile backing panels abut other types of panels in same plane, shim and support surfaces to produce a uniform plane across panel surfaces.

3.05 FRP BACKING PANEL INSTALLATION

A. Refer to the requirements of Section 09 7900 - Protective Plastic Wallcovering.

B. Where backing panels abut other types of panels in same plane, shim and support surfaces to produce a uniform plane across panel surfaces.

3.06 INSTALLATION OF TRIM AND ACCESSORIES

A. Install in accordance with manufacturer's product data.

1. Corner Beads and Trim: Install at external corners, using longest practical lengths.
2. Metal trim shapes: Install at exposed edge of wallboard at door and window openings, at intersections with other materials and at intersection of walls with ceilings.
3. Install corner beads and metal trim shapes to framing system with mechanical anchors spaced at 16 inches on-center for vertical applications, and 16 inches on-center for horizontal applications.

B. Interior Trim: Install in the following locations.

1. Cornerbead: Use at outside corners, unless otherwise indicated.
2. Bullnose Bead: Use at outside corners, only where indicated or where selected by Architect.
3. LC-Bead: Use at exposed panel edges.
4. L-Bead: Use where indicated.
5. U-Bead: Use at exposed panel edges, where indicated.
6. Curved-Edge Cornerbead: Use at curved openings.
7. Other Trim including Reveals: Install in locations indicated on Drawings.

C. Control Joints: Install control joints according to ASTM C840, at any locations indicated on Drawings, and in specific locations approved by Architect for aesthetic visual effect.

1. Place control joints consistent with lines of building spaces. Place not more than 30 feet apart on walls and ceilings measuring over 50 feet long.

D. Decorative Trim: Install at any location indicated on Drawings and in accordance with manufacturer's instructions.

3.07 FINISH LEVELS AND JOINT TREATMENT

A. Finish Levels: Finish gypsum board in accordance with levels defined in ASTM C840, as follows:

1. Level 5: Walls and ceilings to receive semi-gloss, or gloss paint finish and other areas specifically indicated.
2. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
3. Level 3: Walls to receive textured wall finish.
4. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
5. Level 1: Wall areas above finished ceilings, whether or not accessible in the completed construction.
6. Level 0: Temporary partitions.
7. Level 0: Surfaces indicated to be finished in later stage of project.

B. Glass Mat Faced Gypsum Board: Use fiberglass joint tape, embed and finish with setting type joint compound.

C. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.

D. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.

1. Feather coats of joint compound so that camber is maximum 1/32 inch.

E. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

3.08 FIRE AND SMOKE BARRIER IDENTIFICATION

A. Fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions or any other rated wall required to have protected openings shall be effectively and permanently identified with signs or stenciling in a manner acceptable to code officials.

B. Where identification is required to be provided locate as directed by code officials.

C. Provide lettering and coloring as directed by code officials.

D. Use wording nomenclature as directed by code officials.

3.09 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet (3 mm in 3 m) in any direction.

3.10 PROTECTION

A. Protect adjacent surfaces from joint and finishing materials. Repair surfaces stained, marred, or otherwise damaged during installation.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period through date of Substantial Completion.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.

2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 09 2216

NON-STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Exterior non-structural, load bearing metal framing.

B. Interior non-structural, load bearing and non-load bearing metal framing.

C. Interior non-structural metal framing that does not exceed manufacturer standard height or load limitations of standard, non-structural metal framing.

1.03 RELATED REQUIREMENTS

A. Refer to 05 54000 - Cold-Formed Metal Framing, for structural non-load-bearing metal framing that does not exceed height and load limitations of standard, nonstructural metal framing.

B. Refer to Section 05 5000 - Metal Fabrications, for miscellaneous steel shapes, masonry shelf angles, and connections used with cold-formed metal framing.

C. Refer to Section 09 2216 - Non-Structural Metal Framing for the following:

1. Exterior non-structural, load bearing metal framing.
2. Interior non-structural, load bearing and non-load bearing metal framing.
3. Interior non-structural metal framing that does not exceed manufacturer standard height or load limitations of standard, non-structural metal framing.

D. Refer to Section 05 4000 - Cold Formed Metal Framing.

1. Structural load bearing metal framing, exterior and interior applications.
2. Interior non-structural, load-bearing metal framing that exceeds manufacturer standard height and load limitations of standard, non-structural metal framing.

E. For exterior wall system gypsum board sheathing refer to Section 06 1645.

1.04 **REFERENCES**

A. Definitions:

1. Structural Metal Framing: Metal framing intended to support building structural loads at interior and exterior locations in addition to gypsum, wood, or other sheathing boards.

2. Load Bearing Metal Framing: Metal framing intended to support non-structural loads in addition to gypsum, wood, or other sheathing boards including, but not limited to, wall or ceiling mounted items.
3. Non-Load Bearing Metal Framing: Metal framing intended to support only gypsum, wood, or other sheathing boards.
4. Metal Framing: Miscellaneous cold formed steel framing shapes used for support of wall and ceiling assemblies.
5. Sheathing: Boards used as final wall cladding material to be field finished, or as substrate for wall coverings.

B. Reference Standards:

1. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute.
2. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
3. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
4. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
5. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
6. ASTM C955 - Standard Specification for Cold-Formed Steel Structural Framing Members.
7. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories.
8. AWS D1.1/D1.1M - Structural Welding Code - Steel.
9. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel.
10. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer.
11. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic").

1.05 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

1. Coordinate with work of other sections that is to be installed in or adjacent to the metal framing system, including but not limited to structural anchors, cladding anchors, utilities, insulation, and firestopping.

B. Attendees shall include contractor, cold formed metal framing installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.06 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data:

1. Provide data on standard framing members; describe materials and finish, product criteria, limitations.
2. Provide manufacturer's data on factory-made framing connectors, showing compliance with requirements.

C. Shop Drawings:

1. Provide Shop Drawings prepared by cold-formed steel framing manufacturer.
2. Include floor plans at minimum 1/8 inch per foor scale showing location of each partition and framing items, keyed to detals provided. Provide larger scale as needed for clarity.
3. Include details and sections at minimum 1 inch per foor scale. Provide larger scale as needed for clarity.
4. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
5. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.
6. Indicate loading, welds, and type and location of fasteners, and accessories or items required of related work.
7. Indicate each fastener/anchor type proposed for use at each type of project substrate. Provide evidence of suitability of each fastener for each substrate including at high compressive strength post-tensioned concrete locations where cold formed metal framing is installed. Fasteners/anchors at post-tensioned concrete locations shall be as acceptable to project structural engineer.

D. Delegated-Design, Non-Structural, Load Bearing Framing: Provide shop drawings signed and sealed by a professional structural engineer. Calculations for loadings and stresses of framing, signed and sealed by a professional structural engineer.

1. Locate each framing item on floor plans, details, and sections provided in Shop Drawings. Clearly differentiate between each metal framing assembly proposed for use on Project including those provided under other Sections.

E. Delegated-Design, Non-Structural, Non-Load Bearing Framing: Provide shop drawings signed by metal framing manufacturer showing manufacturer standard framing height and load limitations in project specific applications.

1. Locate each framing item on floor plans, details, and sections provided in Shop Drawings. Clearly differentiate between each metal framing assembly proposed for use on Project including those provided under other Sections.

F. Manufacturer's Installation Instructions.

G. Designer's Qualification Statement: Written statement of designer qualifications.

H. Manufacturer's Qualification Statement: Written statement of designer qualifications.

I. Qualification Data: For testing agency.

J. Welding certificates.

K. Product Certificates: For each type of code-compliance certification for studs and tracks.

L. Product Test Reports: For each listed product, for tests performed by manufacturer and witnessed by a qualified testing agency.

1. Steel sheet.
2. Expansion anchors.
3. Power-actuated anchors.
4. Mechanical fasteners.
5. Vertical deflection clips.
6. Horizontal drift deflection clips
7. Miscellaneous structural clips and accessories.

M. Research Reports:

1. For cold-formed steel framing from a qualified testing agency acceptable to authorities having jurisdiction.
2. Steel framing manufacturer to have a third-party evaluation report for its products that are reviewed to applicable project codes and AISI S100.
3. For sill sealer gasket/termite barrier, showing compliance with ICC-ES AC380.

1.07 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements. manufacturer.

1.08 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this Section, and with minimum 15 years of documented experience.

1. Member in good standing of the Steel Framing Industry Association (SFIA).

2. Products to be certified under an independent third-party inspection program administered by an agency accredited by IAS to ICC-ES AC98 IAS Accreditation Criteria for Inspection Agencies.

B. Installer Qualifications: Company specializing in performing the work of this Section with minimum 5 years documented experience.

C. Delegated-Design Requirement: Preparation of Shop Drawings, design calculations, and other structural data shall be completed by a qualified professional engineer.

1. Design framing system under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of Louisiana.

2. Professional Engineer Qualifications: A professional engineer who is licensed in the State of Louisiana and who is experienced in providing engineering services of the kind indicated for installations of cold-formed steel framing that are similar to those indicated for this Project in material, design, and extent.

D. Testing Agency Qualifications: Qualified in accordance with ASTM E329 for testing indicated.

E. Product Tests: Mill certificates or data from a qualified independent testing agency, indicating steel sheet complies with requirements, including base-steel thickness, yield strength, tensile strength, total elongation, chemical requirements, and metallic-coating thickness.

F. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified in accordance with the product-certification program of the Steel Framing Industry Association (SFIA).

G. Welding Qualifications: Qualify procedures and personnel in accordance with the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

H. Fire-Test-Response Characteristics: Where indicated, provide cold-formed steel framing identical to that of assemblies tested for fire resistance per ASTM E119 by, and displaying a classification label from, a testing and inspecting agency acceptable to authorities having jurisdiction.

I. Comply with the following AISI specifications and standards:

1. AISI S100, "North American Specification for the Design of Cold-Formed Steel Structural Members."

2. AISI S200, "North American Standard for Cold-Formed Steel Framing - General Provisions."

3. AISI S201, "North American Standard for Cold-Formed Steel Framing - Product Standard."

4. AISI S202, "Code of Standard Practice for Cold-Formed Steel Structural Framing."

5. AISI S240, "North American Standard for Cold-Formed Steel Structural Framing."

1.09 DELIVERY, STORAGE, AND HANDLING

A. Protect and store cold-formed steel framing from corrosion, moisture staining, deformation, and other damage during delivery, storage, and handling as required in AISI S202.

B. Store materials to permit easy access for inspection and identification.

C. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers.

D. Protect steel members and packaged materials from corrosion and deterioration.

E. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures.

1.10 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this section.

1. Warranty Period: One year from date of Substantial Completion.

B. Special Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, where items fail to perform as designed and manufactured.

1. Warranty Period: Provide manufacturer standard warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: ClarkDietrich Building Systems. www.clarkdietrich.com.

B. Acceptable Manufacturers: Subject to compliance with requirements.

1. CEMCO. www.cemcosteel.com.
2. ClarkDietrich Building Systems. www.clarkdietrich.com.
3. Jaimes Industries. www.jaimesind.com.
4. Marino. www.marinoware.com.
5. Nuconsteel, A Nucor Company.
6. R-stud, LLC. www.rstud.com.
7. SCAFCO Corporation. www.scafco.com.
8. Steel Construction Systems. www.steelconsystems.com.
9. The Steel Network, Inc. www.SteelNetwork.com.
10. United Steel Deck, Inc. www.unitedsteel.com

C. Provide cold formed metal framing, components, and accessories from a single manufacturer unless indicated otherwise.

2.02 PERFORMANCE REQUIREMENTS

A. Delegated-Design: Engage a qualified professional engineer, licensed in the State of Louisiana to design cold-formed steel framing system to meet the project requirements. For configurations within manufacturer standard height and load limits, provide evidence of Delegated-Design and/or third party testing certifying compliance with project specific requirements.

1. Provide cold-formed steel framing within limits and conditions indicated.
    a. Design Loads: As indicated on Drawings and as required by applicable code.
    b. Design framing systems to provide for movement of framing members located outside the insulated building envelope without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F (67 deg C).
    c. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure.
    d. Design wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials to horizontal deflection performance.
    e. Increase metal gages indicated in this Section as needed to provide adequate support for additional construction installed over, or supported by, framing systems. Coordinate with individual product, material, or system manufacturer recommendations.

B. Deflection Limits: Design framing systems to withstand design loads without deflections greater than as indicated. Include loads imposed by additional products, materials, equipment, or systems to be installed over, and supported by framing systems. Increase load requirements as required for additional items.

1. Exterior Applications:
    a. Exterior Load-Bearing Wall Framing: Minimum horizontal deflection of 1/600 of the wall height. Load shall be based on project exterior design requirements.
    b. Exterior Non-Load-Bearing Framing: Minimum horizontal deflection of 1/360 of the wall height. Load shall be based on project exterior design requirements.
2. Interior Applications:
    a. Interior Load-Bearing Wall Framing: Minimum horizontal deflection of 1/360 of the wall height under a horizontal load of 10 lbf/sq. ft.
    b. Interior Non-Load-Bearing Framing: Minimum horizontal deflection of 1/360 of the wall height under a horizontal load of 5 lbf/sq. ft.
3. Overhead Joist Framing: Minimum vertical deflection of 1/360 of the span for live loads and 1/240 for total loads of the span.

C. Cold-Formed Steel Framing Standards: Unless more stringent requirements are indicated, framing to comply with AISI S100 and AISI S200, S220, and S240.

D. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Refer to fire rated assembly requirements indicated on Drawings.
2. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency acceptable to applicable code officials.

E. Coordinate framing assemblies with items to be mounted or supported by the framing system. Provide increased structural performance for locations supporting more than wall sheathing materials.

2.03 COLD-FORMED STEEL FRAMING

A. General - Steel Sheet Materials: ASTM A1003/A1003M, Structural Grade, Type H, metallic coated, of grade and coating designation as follows:

1. Grade: Minimum structural grade 33. Provide increased grade as required for specific performance application.
2. Coating: G60 (Z180) or G90 (Z275). Chemically treated, not oiled.
3. Minimum Base-Metal Thickness for All Items: Provide 18 gage minimum.
    a. Provide thicker/heavier gage in locations where cladding or wall assembly to be installed over metal framing is recommended by the manufacturer of those products/assemblies to be heavier gage.
    b. Provide thicker/heavier gage in locations where indicated by Delegated-Design requirements.
    c. Provide thicker/heavier gage for framing items indicated in this Section.

B. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Flange Width: As indicated on drawings or as indicated by Delegated-Design requirements.
2. Provide 16" on center stud spacing maximum. Brace as necessary.

C. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with straight flanges, and as follows:

1. Flange Width: 1-1/4 inches or as indicated by Delegated-Design requirements.
2. Minimum 1 inch depth.
3. Width as required to receive studs.

D. Deflection Clips and Tracks:

1. General:
    a. Minimum Base-Metal Thickness: 14 gage minimum.

b. Flange Width: As indicated on Drawings or as indicated by Delegated-Design requirements.

2. Vertical Deflection and Horizontal Standoff Clips: Manufacturer's standard bypass clips with horizontal standoff, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

3. Head-of-Wall Deflection Clips: Manufacturer's standard head clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

4. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure, and as follows:

   a. Provide a flange width of 2-1/2" minimum. Track shall be same nominal depth as studs with allowance for deflection of standard deep leg track.

5. Single Deflection and Firestop Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal and lateral loads and transfer them to the primary structure

6. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.

   a. Provide a flange width of 2-1/2" minimum. Track shall be same nominal depth as studs with allowance for deflection of standard deep leg track.

7. Slotted Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; punched with vertical slots in both legs. Studs should be positively attached to deep-leg track using vertical slots while allowing free vertical movement. Legs designed to support horizontal and lateral loads and transfer them to the primary structure

E. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

F. Purlins and Girts: Structural Grade 230 minimum, Type L.

G. Joists: Size, gauge, spacing and anchorage of joists shall be as qualified by design, and as indicated on approved shop drawings. Coordinate with Delegated-Design requirements.

1. Components shall be unpunched and continuous without splicing.

H. Headers and Jambs - Heavy-Duty Stud: Manufacturer's proprietary shape used to form header beams and jambs, columns or posts, of web depths indicated, unpunched, with stiffened flanges and as follows:

I. Steel Joists: Manufacturer's standard C-shaped steel joists, of web depths indicated, unpunched, and continuous without splicing, with stiffened flanges, and as follows:

1. Flange Width: As indicated on drawings or as indicated by Delegated-Design requirements.

J. U-Channel Assembly: Manufacturer's standard-length U-channel for lateral bracing for exterior curtain-wall framing.

K. Firestop Track: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

2.04 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from ASTM A1003/A1003M, Structural Grade, Type H, metallic coated steel sheet, of same grade and coating designation used for framing members. Thickness and configuration shall be accordance with specified requirements.

1. Framing Connectors: ASTM A653/A653M G90 galvanized steel clips; secures cold rolled channel to wall studs for lateral bracing.
2. Materials: ASTM A36/A36M formed sheet steel support member with factory-welded ASTM A1003/A1003M steel plate base.

B. Typical Framing Accessories: Include, but are not limited to the following, as applicable.

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. Anchor clips.
5. End clips.
6. Foundation clips.
7. Gusset plates.
8. Stud kickers and knee braces.
9. Joist hangers and end closures.
10. Hole-reinforcing plates.
11. Backer plates.

2.05 ANCHORS, CLIPS, AND FASTENERS

A. General: Fastener/anchor shall of type suitable for substrate. Evidence of suitability is required for each fastener/anchor, for each substrate including at high compressive strength post-tensioned concrete locations where cold formed metal framing is installed.

B. Steel Shapes and Clips: ASTM A36/A36M, zinc coated by hot-dip process according to ASTM A123/A123M.

C. Anchor Bolts: ASTM F1554. Zinc coated by hot-dip process in accordance with ASTM A153/A153M, Class C.

D. Post-Installed Anchors: Fastener systems with bolts of same basic metal as fastened metal, if visible, unless otherwise indicated; with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, ICC-ES AC193, ICC-ES AC58, or ICC-ES AC308 as appropriate for the substrate.

1. Material for Dry Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941 (ASTM F1941M), Class Fe/Zn 5, unless otherwise indicated.
2. Material for Exterior or Interior Wet Locations and Where Stainless Steel Is Indicated: Alloy Group 1 (A1, type 304) or Group 2 (A4, type 316) stainless steel bolts, ASTM F593, and nuts, ASTM F594.

E. Power-Actuated Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

F. Mechanical Fasteners: ASTM C1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.

1. Head Type: Low-profile head beneath sheathing; manufacturer's standard elsewhere.

G. Welding Electrodes: Comply with AWS standards.

2.06 ANCHORS, GYPSUM BOARD

A. General: Fastener/anchor shall of type suitable for substrate. Evidence of suitability is required for each fastener/anchor, for each substrate including at high compressive strength post-tensioned concrete locations where cold formed metal framing is installed.

B. Expansion anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E488 conducted by a qualified testing agency.

C. Power-actuated anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with allowable load capacities calculated according to ICC-ES AC70, greater than or equal to the design load, as determined by testing per ASTM E1190 conducted by a qualified testing agency.

2.07 FLEXIBLE WOOD BACKING PLATE

A. Basis of Design: Subject to compliance with requirements provide Danback by ClarkDietrich Building Systems. www.clarkdietrich.com.

B. Suitable for backing applications within 16-inch or 24-inch on-center framing assemblies, including but not limited to the following.

1. Handrails.

2. Baseboards.
3. Door Jams and Wood Trim.
4. Cabinets and Vanities.
5. Moldings.

C. Fire-retardant treated wood blocking and bracing with sheet steel connectors. UL Fire Retardant rated. EPA Registered. IBC and IRC compliant.
1. Material: 3/4" CDX Doug Fir D-Blaze or FlamePRO fire-retardant treated wood.
2. Dimensions: 5-1/8" x 48".

2.08 MISCELLANEOUS INSTALLATION ACCESSORIES

A. General: Accessories shall comply with ASTM C1047.

B. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.

C. Partial Height Wall Framing Support: Provides stud reinforcement and anchored connection to floor.

D. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch (0.84 mm) in Thickness: ASTM C1002; self-piercing tapping screws, corrosion resistant.

E. Screws for Fastening of Gypsum Panel Products to Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.

F. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch (0.84 to 2.84 mm) in Thickness: ASTM C954; steel drill screws, corrosion resistant.

G. Screws for tile backer board application: Corrosion resistant sheet metal screws with head diameter providing 125 lb. fastener pull-through and pull-out resistance. Screw length shall provide 1/4" minimum thread engagement.

H. Furring channels: Minimum 25 ga. galvanized steel, 7/8 inch deep by 1-3/8 inch face width.

I. "Z" furring channels: Minimum 25 ga. galvanized steel.

J. Cold-rolled channels: Minimum 16 ga. steel, hot dip galvanized or black asphaltum-painted, as follows:
1. 3/4 inch depth: 300 lbs./lf, for use as horizontal stiffeners, bracing and cross furring.
2. 1-1/2 inch depth: 475 lbs./lf, for use as main ceiling runners.

K. Furring channel clips: Manufacturer's standard type for attachment of furring channels to cold-rolled runner channels.

L. Resilient channel: Galvanized steel, manufacturer's standard type.

M. Furring brackets: Minimum 20 ga. galvanized steel, for attaching 3/4 inch furring channels to masonry walls.

N. Ceiling hanger wire: Minimum 18 ga. galvanized annealed steel wire.

O. Tie wire: Minimum 18 ga. galvanized annealed steel wire.

P. Wall Mounted Deflection Beads: Flexible gasket and bead with 1-1/8 inch flange.

Q. Control joints: Control joint shall be designed to be applied after wall board is installed. Expanded metal or perforated flanges shall accept joint compound for a flush finish. Control joints shall provide stress relief and shall assist in controlling cracking in large areas of wallboard.

R. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place in accordance with specified requirements.

2.09 GROUT AND ANCHORING CEMENT

A. Exterior and Wet Area Non-shrink, Nonmetallic Grout: Premixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with ASTM C1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

B. Interior Dry Area Anchoring Cement: Factory-packaged, non-shrink, non-staining, hydraulic-controlled expansion cement formulation for mixing with water at project site to create pourable anchoring, patching and grouting compound. Use for interior application only.

C. Coordinate grout and anchoring cement with project structural requirements and applicable Delegated-Design requirements. Notify project structural engineer of conflicts. Where conflict exists, the more stringent requirement shall apply.

2.10 SILL TRACK SEALER GASKETS FOR METAL STUD FRAMING

A. For use where metal stud wall framing sill directly abuts concrete. Installation shall be continuous.

B. Interior Wall - Sill Track Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members as required.

1. Basis of Design: Protecto Energy Plate Liner by Protecto Wrap, www.protectowrap.com

C. Exterior Wall Sill Sealer Gasket: 3/8 inch thick closed cell polyethylene foam with self-adhering waterproof coating on one side. Width of wall studs and sole plate.

1. Basis of Design: Premium Energy Sill Sealer by Protecto Wrap, www.protectowrap.com

2.11 MISCELLANEOUS MATERIALS

A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.

B. Galvanizing Repair Paint: ASTM A780/A780M.

C. Shims: Load-bearing, high-density, multimonomer, nonleaching plastic; or cold-formed steel of same grade and metallic coating as framing members supported by shims.

D. Grommets: Provide protective grommets recommended by metal framing manufacturer for electrical wire and plumbing pipe passage through metal framing members.

2.12 DISSIMILAR MATERIAL PROTECTION

A. Bituminous Paint/Coating: Refer to Section 07 1115 - Protective Bituminous Paint Coating.
   1. Coordinate with requirements of product/material manufacturer(s) of this Section.
   2. For use as corrosion protection between dissimilar materials.
   3. Apply in two coats for full coverage minimum 30 dry mil thickness, unless indicated otherwise.

2.13 WALL SHEATHING

A. Refer to Section 09 2116 - Gypsum Board Assemblies.

B. Refer to Section 06 1645 - Exterior Gypsum Sheathing.

2.14 FABRICATION

A. Fabricate cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.
   1. Fabricate framing assemblies using jigs or templates.
   2. Cut framing members by sawing or shearing; do not torch cut.
   3. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, pneumatic pin fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.
      a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
      b. Locate mechanical fasteners and install according to Shop Drawings, with screws penetrating joined members by no fewer than three exposed screw threads.
   4. Fasten other materials to cold-formed steel framing by welding, bolting, pneumatic pin fastening, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies by means that prevent damage or permanent distortion.

C. Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable variation of 1/8 inch in 10 feet (1:960) and as follows:
   1. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

2. Squareness: Fabricate each cold-formed steel framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, conditions, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 PREPARATION

A. Coordinate with installation of fire-resistive materials applied to structural materials adjacent to or in contact with metal framing material's.

B. Install shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch (6 mm) to ensure a uniform bearing surface on supporting concrete or masonry construction.

C. Install sill sealer gaskets at the underside of wall bottom tracks or rim tracks and at the top of wall metal framing locations.

3.03 INSTALLATION, GENERAL

A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed steel framing according to AISI S200, AISI S202, and manufacturer's written instructions unless more stringent requirements are indicated.

C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.

1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch (1.6 mm).

D. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.

1. Cut framing members by sawing or shearing; do not torch cut.
2. Fasten cold-formed steel framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.
    a. Comply with AWS D1.3/D1.3M requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

b. Locate mechanical fasteners, install according to Shop Drawings, and comply with requirements for spacing, edge distances, and screw penetration.

E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.

F. Install temporary bracing and supports to secure framing and support loads equal to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

G. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.

H. Install sound control or thermal control insulation as specified in other sections. Coordinate installation with locations that are inaccessible on completion of metal framing work.

I. Fasten hole-reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

J. Set items plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.

K. Align studs vertically where floor framing interrupts wall-framing continuity. Where studs cannot be aligned, continuously reinforce track to transfer loads.

L. Align floor and roof framing over studs in accordance with AISI S200, Section C1. Where framing cannot be aligned, continuously reinforce track to transfer loads.

M. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure.

N. Cutting:

1. Cutting for utilities: Do not remove, notch, cut or relocate load-bearing studs or other structural members for utility installation or other cause without prior approval of Architect.
2. Cut-outs: Minimize cut-outs for utilities and bridging. Locate cut-outs near bottom, but not less than 12 inches from bottom track. No cut-outs allowed at mid-points or tie points.
3. Perform cutting with a power-driven saw with an abrasive blade. No hand cutting will be permitted. Cuts shall be clean, accurate and true to line.

O. Attachment: Secure abutting and intersecting members using methods indicated by Delegated-Design. Where not indicated, the following shall apply:

1. Secure 18 gage and lighter members using screws. Secure 16 gage and heavier by welding.
2. Screws: Comply with screw manufacturer’s product data and ASTM C954 for minimum spacing and edge distance requirements and for torque requirements.

a. Screw penetration through joined materials shall be minimum of three exposed screw threads.

3. Welding:

a. Welds shall develop 1,000 psi minimum strength to structural framing, 500 psi minimum strength to other cold-formed metal framing components; comply with AWS methods and requirements.

b. Weld only 16 gauge and heavier members directly to structural framing; weld 18 gauge and lighter members to 16 gauge or heavier clips, then weld clips to structural framing.

c. Weld to adjacent steel construction whenever possible.

d. Screw or bolt to dissimilar construction and where welding is not possible or feasible.

P. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.

Q. Install miscellaneous framing and connections, including but not limited to stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system complying with specified requirements.

3.04 ERECTION TOLERANCES

A. Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows.

B. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.05 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

3.06 FIELD QUALITY CONTROL

A. Testing: Contractor shall engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field and shop welds will be subject to testing and inspecting.

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Tests and Inspections:

1. Cold-formed steel framing will be considered defective if it does not pass tests and inspections.
2. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.07 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed steel framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 09 3000

INTERIOR TILING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Tiling for interior floor applications.

B. Tiling for interior wall applications.

C. Accessories.

1.03 REFERENCES

A. Definitions:

1. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
2. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in its "Specifications for Installation of Ceramic Tile."
3. Face Size: Actual tile size, excluding spacer lugs.
4. Module Size: Actual tile size plus joint width indicated.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation to discuss conformance with project requirements, manufacturer installation requirements, affected adjacent materials and system, and site conditions.

B. Attendees shall include contractor, tile installer, mortar and grout manufacturer technical representative, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.

C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, setting details, and accessories.

1. Tile Assemblies: Indicate compliance with specified TCNA assemblies. Where discrepancy exists between TCNA recommendations and specified requirements, note in submittal for Architect review and coordination.

D. Samples for Initial Selection: Provide manufacturer standard samples for tile, grout, and accessories requiring color selection.

E. Sample for Verification:

1. Provide assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 12 inches square, but not fewer than four tiles. Use grout of type and in color or colors approved by Initial Selection.

2. Metal edge strips in 6-inch lengths.

F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

G. Master Grade Certificate: Submit for each type of tile, signed by the tile manufacturer and tile installer.

1.06 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements.

C. Maintenance Data: Include recommended cleaning methods, cleaning materials, and stain removal methods.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. Extra Tile: 5 percent of each size, color, and surface finish combination, but not less than two original cartons of each type.

1.07 QUALITY ASSURANCE

A. Maintain one copy of and ANSI A108/A118/A136 and TCNA (HB) on site.

B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this Section, with minimum five years of documented experience.

C. Installer Qualifications: Company specializing in performing tile installation, with minimum of five years of documented experience.

1. Installer shall be a Five-Star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.

1.08 MOCKUPS

A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup of each type of tile installation.
2. Size and location of mock-ups to be selected by Architect.

B. Subject to compliance with requirements, approved mockups may become part of the completed Work if accepted to remain by Architect and if undisturbed at time of Substantial Completion.

C. Approval of mockups does not constitute approval of deviations from the Contract Documents unless Architect specifically approves such deviations in writing.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

D. Store liquid materials in unopened containers and protected from freezing.

E. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

1.10 FIELD CONDITIONS

A. Do not install solvent-based products in an unventilated environment.

B. Maintain ambient and substrate temperature of 50 degrees F (10 degrees C) during installation of mortar materials.

C. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

1.11 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.

1. Warranty Period: One year from date of Substantial Completion.

B. Special Manufacturer Warranty - Mortar Setting and Grouting System Warranty: Provide setting and grouting system manufacturer system warranty against bond failure, cracking, installation, and material defects.

1. Warranty Period: Ten years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 TILE

A. Tile Selections: As indicated on Drawings.

1. Drawing Designation: TB-1.
2. n/a.
3. Drawing Designation: WT-1.
4. Drawing Designation: WT-2.
5. Drawing Designation: WT-3.
6. Drawing Designation: WT-4.
7. Drawing Designation: WT-5.
8. Drawing Designation: WT-6.
9. n/a.
10. Drawing Designation: FT-1.

B. Performance and Technical Requirements: As indicated by basis of design selections.

C. Trim Units: Matching bead, bullnose, cove, and base shapes in sizes coordinated with field tile.

D. Fabrication:

1. Factory blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
2. Factory-applied temporary protective coating: Where indicated under tile type, protect exposed surfaces of tile against adhesion of mortar and grout by precoating with continuous film of release agent as recommended by mortar and grout manufacturer or a hot-applied petroleum paraffin wax. Do not coat backs or sides of tile surfaces.

2.02 METAL TRANSITIONS AT TILING ASSEMBLIES

A. Refer to Section - 09 7000 - Metal Wall and Floor Transitions.

2.03 SETTING MATERIALS

A. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4.

1. Applications: Use this type of bond coat where indicated at floors.

2. Provide mortar bed manufacturer primer for substrates where primer is recommended by mortar bed manufacturer.
3. Products:
   a. Basis of Design: Custom Building Products; ProLite Premium Rapid Setting Large Format Tile Mortar: www.custombuildingproducts.com.
   b. ARDEX Engineered Cements; ARDEX N 23 MICROTEC: www.ardexamericas.com.
   c. Merkrete, by Parex USA, Inc; Merkrete 735 Premium Flex: www.merkrete.com.
   d. TEC, an H.B. Fuller Construction Products Brand; TEC 3N1 Performance Mortar: www.tecspecialty.com.
   e. Mapei Corp., UltraFlex LFT: www.mapei.com/US-EN.

B. Improved Latex-Portland Cement Mortar Bond Coat: ANSI A118.15.
1. Applications: Use this type of bond coat where indicated at walls.
2. Properties: Non-sag, pre-sanded, polymer-modified Portland cement and additives meeting ANSI A118.4, ANSI A118.11 and ANSI A118.15, non-sag, minimum 400 psi shear strength for porcelain tile at 28 days.
3. Provide mortar bed manufacturer primer for substrates where primer is recommended by mortar bed manufacturer.
4. Products:
   a. Basis of Design: Custom Building Products; Complete Contact-LFT Premium Rapid Setting Large Format Tile Mortar: www.custombuildingproducts.com.
   b. ARDEX Engineered Cements; S 28: www.ardexamericas.com.
   c. LATICRETE International, Inc; LATICRETE 254 Platinum: www.laticrete.com.
   d. TEC, an H.B. Fuller Construction Products Brand; TEC 3N1 Performance Mortar: www.tecspecialty.com.
   e. Mapei Corp., UltraFlex LFT: www.mapei.com/US-EN.

2.04 GROUTS

A. Epoxy Grout: ANSI A118.3 chemical resistant and water-cleanable epoxy grout.
1. Applications: Floors and walls in locations indicated.
2. Color(s): As selected by Architect from manufacturer's full line.
3. Properties: Two- or three-component, water-cleanable, 100% solids epoxy grout meeting ANSI A118.3; standard colors selected by Architect.
4. Tile Surface Release Agent: Provide grout manufacturer’s recommended grout release agent for application to tile surfaces prior to grouting tile.
5. Sealers: Not required.
6. Efflorescence: None.
7. Products:

a. Basis of Design: Custom Building Products; CEG-Lite 100% Solids Commercial Epoxy Grout: www.custombuildingproducts.com.

b. ARDEX Engineered Cements; ARDEX WA: www.ardexamericas.com.

c. LATICRETE International, Inc; LATICRETE SPECTRALOCK PRO Premium Grout: www.laticrete.com.

d. TEC, an H.B. Fuller Construction Products Brand; TEC AccuColor EFX Epoxy Special Effects Grout: www.tecspecialty.com.

e. Mapei Corp., Kerapoxy or Kerapoxy CQ..

2.05 ADDITIVES

A. Provide additives as recommended by mortar and grout manufacturer. Additives shall be manufactured or approved by mortar and grout manufacturer.

2.06 SEALANTS, SEALERS, EXPANSION AND CONTROL JOINTS

A. Tile Sealant: Gunnable, silicone, siliconized acrylic, or urethane sealant; moisture and mildew resistant type.

1. Applications: Between tile and plumbing fixtures.
2. Color(s): As selected by Architect from manufacturer's full line.
3. Selection: Select product for specific application. Coordinate with adjacent finishes and painting requirements.
4. Primer: As recommended by sealant manufacturer’s product data:
5. Products:

a. Use sealants recommended by mortar and grout manufacturer. Sealants shall be manufactured, or approved by mortar and grout manufacturer. Refer to Section 07 9200 - Joint Sealants.

b. Basis of Design: Custom Building Products; Commercial 100% Silicone Caulk: www.custombuildingproducts.com.

B. Expansion and Control Joints:

1. Provide as recommended by setting bed and grout manufacturer and in accordance with TCNA guidelines.
2. Materials: Use specified tile sealant and closed cell joint backing materials as recommended by sealant manufacturer.

C. Grout Sealer: Liquid-applied, moisture and stain protection as recommended by grout manufacturer.

D. Tile Sealer: Liquid-applied, moisture and stain protection as recommended by tile grout manufacturer.

E. Grout Release: Temporary, water-soluble pre-grout coating.

1. Products:

a. Basis of Design: Custom Building Products; Aqua Mix Grout Release: www.custombuildingproducts.com.

2.07 ACCESSORY MATERIALS

A. Concrete Floor Slab Crack Isolation Membrane: Material complying with ANSI A118.12 and ANSI A118.10; not intended as waterproofing.

1. For use at locations other than showers, sauna, and steam rooms.
2. Fluid or Trowel Applied Type:
   a. Designed for interior and exterior substrates, to reduce crack transmission in tile and stone floors. Acceptable for use as a slab-on-grade moisture vapor barrier.
   b. Crack Resistance: No failure at 1/16 inch (1.6 mm) gap, minimum.
   c. Material: Synthetic rubber or Acrylic.
   d. Products:
      1) Basis of Design: Custom Building Products; Crack Buster Pro: www.custombuildingproducts.com.
      2) TEC, an H.B. Fuller Construction Products Brand; TEC HydraFlex Waterproofing Crack Isolation Membrane: www.tecspecialty.com.
      3) LATICRETE International, Inc; LATICRETE HYDRO BAN: www.laticrete.com.

B. Waterproofing Membrane for Wet Areas - Reinforced: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10.

1. Fluid or Trowel Applied Type:
   a. Flexible, seamless waterproofing membrane system with a liquid applied polymer and reinforcing fabric.
   b. Waterproofing membrane rated for extra heavy-duty service.
   c. Anti-fracture protection up to 1/8" (3 mm)
   d. Material: Synthetic rubber or Acrylic.
   e. Substrate Primer: Provide product by membrane system manufacturer as recommended for project specific substrates.
   f. Reinforcement: As provided by membrane manufacturer for use with membrane system.
2. Basis of Design: Custom 9240 Waterproofing and Anti-Fracture Membrane by Custom Building Products. www.custombuildingproducts.com.

C. Tile Backer Board: Cementitious type complying with ANSI A118.9; high density, glass fiber reinforced, 1/2 inch (12.7 mm) thick; 2 inch (51 mm) wide coated glass fiber tape for joints and corners.

D. Tile Backer Board: Coated glass mat type complying with ASTM C1178/C1178M; inorganic fiberglass mat on both surfaces and integral acrylic coating vapor retarder.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.

B. Verify that required utilities are in correct location.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 PREPARATION

A. Protect surrounding work from damage.

B. Vacuum clean surfaces and damp clean.

C. Seal substrate surface cracks with filler. Level substrate surfaces to acceptable flatness tolerances.

D. Install backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of setting material to a feather edge.

E. Prepare substrate surfaces for adhesive installation in accordance with adhesive manufacturer's instructions.

F. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

3.03 INSTALLATION - GENERAL

A. Install tile and grout in accordance with applicable requirements of ANSI A108.1a through ANSI A108.13, manufacturer's instructions, and TCNA (HB) recommendations.

1. Comply with specified TCNA assemblies. Where discrepancy exists between TCNA recommendations and specified requirements, do not begin installation until Architect has reviewed for coordination and resolution.

B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.

C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align wall joints.

D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.

E. Form internal angles square and external angles bullnosed.

F. Install accessories and trim in accordance with manufacturer's instructions.

G. Install transitions where indicated.

H. Sound tile after setting. Replace hollow sounding units.

I. Keep control and expansion joints free of mortar, grout, and adhesive.

J. Prior to grouting, allow installation to completely cure; minimum of 48 hours.

K. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated.

L. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

M. Where waterproofing membrane is installed, extend full coverage beneath all tile and accessory areas (i.e. niches, recesses, curbs, etc). Permanently exposed waterproofing membrane is not permitted.

3.04 CLEANING

A. Clean installed tile and grout surfaces in accordance with material manufacturer instructions.

3.05 INTERIOR FLOOR TILE INSTALLATION SCHEDULE, THIN SET

A. Interior slab-on-grade concrete floors, dry area, thin set:
   1. Tile Installation: TCNA F125; thin setting to full coverage crack isolation membrane.
      a. Prepared concrete subfloor.
      b. Concrete Floor Slab Crack Isolation Membrane.
      c. Bond Coat: Latex-Portland Cement Mortar Bond Coat.
      d. Tile: As indicated.
   2. Grout: Epoxy grout.
   3. Requirements: Clean, porous, uncontaminated interior slab on grade concrete. For other substrates not meeting these requirements, refer to TCNA Handbook, current edition.

B. Interior slab-on-grade concrete floors, wet area, thin set:
   1. Tile Installation: TCNA F122; thin setting to full coverage waterproofing and crack isolation membrane.
      a. Prepared concrete subfloor.
      b. Waterproof membrane. Tie into all drain flanges and extend full height of tile installation up all perimeter walls and at-field interruptions such as columns, wing walls, and chases to create a fully waterproofed tile installation area.
      c. Bond Coat: Latex-Portland Cement Mortar Bond Coat.
      d. Tile: As indicated.
   2. Grout: Epoxy grout.

3. Requirements: Clean, porous, uncontaminated interior slab on grade concrete. For other substrates not meeting these requirements, refer to TCNA Handbook, current edition.

3.06 INTERIOR WALL TILE INSTALLATION SCHEDULE

A. Walls, dry areas, over wood or metal studs, thin set:

1. Tile Installation: TCNA W243; thinset mortar on cementitious backer board.
2. Bond Coat: Improved Latex-Portland Cement Mortar Bond Coat.
3. Grout: Epoxy grout.

B. Walls, wet areas, over wood or metal studs, thin set:

1. Tile Installation: TCNA W244; thinset mortar on cementitious backer board or fiber-cement backer board with waterproofing membrane.
2. Waterproof membrane. Tie into all drain flanges and extend full height of tile installation up all perimeter walls and at-field interruptions such as columns, wing walls, and chases to create a fully waterproofed tile installation area.
3. Bond Coat: Improved Latex-Portland Cement Mortar Bond Coat.
4. Grout: Epoxy grout.

END OF SECTION

SECTION 09 5100

ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Acoustical units.

B. Suspended metal grid system.

C. System trim and accessories.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
2. Do not install acoustical units until after interior wet work is dry.
3. Schedule acoustical material installation to minimize need for removal and replacement of acoustical units to accommodate work of other trades.

B. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

1. Attendees shall include contractor, acoustical system installer, manufacturer technical representative, and installers of adjacent materials and systems.
2. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.04 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: For each type of product.

1. Suspension system components.
2. Ceiling tiles and panels.
3. Molding and trims.
4. Special items.
5. Acoustical sealants.

C. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

D. Shop Drawings: Indicate grid layout and related dimensioning.

E. Samples: Submit two samples 12 by 12 inches in size illustrating material and finish of acoustical units.

F. Samples: Submit two samples each, 12 inches long, of suspension system main runner.

G. Delegated-Design Submittal: For seismic restraints for ceiling systems.

1. Include design calculations for seismic restraints including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
2. Include compliance with exterior cladding code requirements, including wind resistance, for exterior parking garage ceiling system installations.

H. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Seismic System Design:
    a. Indicate compliance with applicable codes.
    b. Indicate compliance with recommendations CISCA Seismic Construction Handbook, current edition.
2. Ceiling suspension-system members.
3. Structural members to which suspension systems will be attached.
4. Method of attaching hangers to building structure.
    a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
5. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
6. Size and location of initial access modules for acoustical tile.
7. Items penetrating finished ceiling and ceiling-mounted items including the following:
    a. Lighting fixtures.
    b. Diffusers.
    c. Grilles.
    d. Speakers.
    e. Sprinklers.
    f. Access panels.
    g. Perimeter moldings.
8. Location of acoustical sealants.
9. Show operation of hinged and sliding components adjacent to acoustical tiles.
10. Minimum Drawing Scale: 1/8 inch = 1 foot (1:96).

I. Qualification Data: For testing agency.

J. Product Test Reports: For each acoustical tile ceiling, for tests performed by a qualified testing agency.

K. Evaluation Reports: For each acoustical tile ceiling suspension system and anchor and fastener type, from ICC-ES.

L. Field quality-control reports.

1.05 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements.

C. Maintenance Data: Provide manufacturer parts lists, operation, and maintenance instructions for the materials of this Section.

D. Maintenance Materials: Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Units: One carton or box of each type installed.
2. Suspension-System Components: One carton or box of each type installed.

1.06 QUALITY ASSURANCE

A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.07 MOCKUPS

A. Mockup: Provide a mockup for evaluation of installation, finishes, and workmanship.

1. Locate as directed by Architect.
2. Size: Minimum 25 square feet in configuration directed by Architect. Provide for each type of system, as directed by Architect.

B. Do not proceed with installation beyond mockup until the mockup installation is approved by Architect. Correct deficiencies and refinish mock-up area as required to produce acceptable work.

C. Subject to compliance with requirements, approved mockups may become part of the completed Work if accepted to remain by Architect and if undisturbed at time of Substantial Completion. Remove mockup when directed by Architect.

D. Approval of mockups does not constitute approval of deviations from the Contract Documents unless Architect specifically approves such deviations in writing.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.09 FIELD CONDITIONS

A. Maintain uniform temperature in accordance with manufacturer recommendations.

B. Environmental Limitations: Do not install acoustical tile ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.10 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, where items fail to perform as designed and manufactured.

1. Warranty Period: Two years from date of Substantial Completion.

C. Special Warranty Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace materials that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Warranty Period: Ten years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 ACOUSTICAL UNITS

A. Acoustical Units - General:

1. Glass-fiber-based panels made with and containing no urea formaldehyde.
2. Surface burning characteristics meeting ASTM E1264, Class A.

B. Source limitations: Obtain each type of acoustical ceiling panel and supporting suspension system from single source from single manufacturer.

C. Selections: As indicated on Drawings.
   1. Drawing Designation: ACT-1.
   2. Drawing Designation: ACT-2.

2.02 SUSPENSION SYSTEM

A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.
   1. Provide complete standard direct-hung metal ceiling tile suspension system meeting applicable building code required structural and seismic classifications.

B. Exposed Steel Suspension System Type 15/16": Formed steel, commercial quality cold rolled.
   1. Profile: Tee; 15/16 inch (24 mm) wide face. Minimum 1-1/2" nominal height main tee.
   2. Grid Size: As required to match specified acoustical panel or tile size.
   3. Construction: Double web.
   4. Edge Molding:
      a. Square Edge Panels: Provide hemmed edges in channel or angle shapes.
      b. Reveal Edge Panels: Provide hemmed edges in "Shadow Line" shape. --
   5. Flange Widths: Shall be as required to meet applicable structural and seismic classifications. Minimum 3/4".
   6. Materials: Hot dip galvanized, cold rolled steel. Metal thicknesses shall be as required to meet applicable structural and seismic classifications.
   7. Finish (Exposed Components): White painted. Manufacturer standard system using chemically treated paint adhesion system with factory applied, low gloss paint.
   8. Products:
      a. Basis of Design: Armstrong World Industries, Inc, Armstrong Prelude XL 15/16.

2.03 ACCESSORIES

A. Provide accessories as needed for a complete acoustical ceiling system installation. All accessories shall be sized to comply with applicable code requirements for structural and seismic design. Sizes listed shall be considered minimums and the most stringent requirement shall apply.
   1. Accessories exposed to view shall be finished to match adjacent ceiling grid.
   2. Provide accessories for ceiling grid system in compatible, non dissimilar, non corrosive metals.
   3. Coordinate design, configuration, and installation of systems of this Section with the requirements of Section 05 4000, as applicable.

B. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E488/E488M or ASTM E1512 as applicable, conducted by a qualified testing and inspecting agency.
    a. Corrosion Protection: Carbon-steel components zinc plated according to ASTM B633, Class SC 1 (mild) service condition.
    b. Corrosion Protection: Stainless-steel components complying with ASTM F593 and ASTM F594, Group 1 Alloy 304 or 316.
    c. Corrosion Protection: Components fabricated from nickel-copper-alloy rods complying with ASTM B164 for UNS No. N04400 alloy.
2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E1190, conducted by a qualified testing and inspecting agency.

C. Support Channels: Minimum 16 ga. cold-rolled steel, 1-1/2" deep.

D. Wire Hangers, Braces, and Ties: Provide wires as follows:
1. Zinc-Coated, Carbon-Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.
2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C635/C635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.106-inch.

E. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.

F. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.

G. Angle Hangers: Angles with legs not less than 7/8 inch (22 mm) wide; formed with 0.04-inch- (1-mm-) thick, galvanized-steel sheet complying with ASTM A653/A653M, G90 (Z275) coating designation; with bolted connections and 5/16-inch- (8-mm-) diameter bolts.

H. T-Grid support clip: Mechanical clip for attaching acoustical “T” to edge molding without exposed fasteners in grid system.
1. Acceptable products:
    a. Armstrong World Industries, Inc., Beam End Retainer Clip Item 7395.
    b. Rockfon, 1493 Unopposed Tee Clip.
    c. Erico Products, Inc., Caddy TGE T-Grid support clip.
    d. USG Industries, Inc., Mac 2.

I. Hold-Down Clips: Manufacturer's standard hold-down.

J. Impact Clips: Manufacturer's standard impact-clip system designed to absorb impact forces against acoustical panels.

K. Stabilizer Clips: Provide manufacturer recommended and provided stabilizer clips where length of lateral grid supports is greater than 5 feet on-center. Provide on both (opposing) sides of field installation whenever condition occurs.

L. Seismic Clips: Manufacturer's seismic clips designed to secure acoustical panels in place during a seismic event.

M. Seismic Stabilizer Bars: Manufacturer's perimeter stabilizers designed to accommodate seismic forces.

N. Seismic Struts: Manufacturer's compression struts designed to accommodate seismic forces.

O. Perimeter Moldings: Same material and finish as grid.

1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.

P. Perimeter Trim:

1. For use as follows:

a. Where indicated on Drawings.

2. Finish and color to match adjacent ceiling suspension grid.

3. Basis of Design: Armstrong World Industries, Inc., Axiom.

Q. Special Shapes for Transitions:

1. Aluminum moldings and trim in shapes indicated.

2. Finish and color to match adjacent ceiling suspension grid.

3. Provide products by the following manufacturers, subject to compliance with specified requirements.

a. Fry Reglet Corp.

b. Gordon, Inc.

c. Pittcon Industries.

R. Hangar Brackets for Gypsum Sub-Ceilings:

1. Minimum 20 ga. galvanized steel bracket designed for screw attachment through gypsum board main tees and hangar wire attachment for secondary ceiling.

2. Acceptable Product: Armstrong World Industries, Inc., Drywall Hanger Clip (DWC).

S. Hangar Brackets for Panel Sub-Ceilings:

1. Minimum 25 ga. galvanized steel bracket designed to fit over ceiling grid tees for attachment of hangars for secondary ceiling.

2. Acceptable Product: Armstrong World Industries, Inc., Direct Load Ceiling Clip (DLCC).

2.04 ACOUSTICAL SOUND CONTROL ACCESSORIES

A. Fiberglass Batts and Blankets for Sound-Attenuation: ASTM C665, Type I (without facing) fiberglass insulation..

1. Minimum 1-1/2" thickness and 2-1/2 lb. density,
2. Acceptable Products: Subject to compliance with requirements.
    a. InsulPure by CertainTeed, a business unit of Saint Gobain. www.certainteed.com
    b. Ecobatt by Knauf Insulation. www.knaufnorthamerica.com
    c. JM Formaldehyde-Free Fiberglass Insulation by Johns Manville, a Berkshire Hathaway Company. www.jm.com
    d. Pink Next Gen Sound Attenuation Batts by Owens-Corning Corp. www.owenscorning.com
3. Characteristics:
    a. Type: Unfaced fiberglass batts for friction fit or stapled/supported installation between studs, complying with ASTM C665, Type 1.
    b. Surface burning characteristics: Maximum 25 flame spread and 50 smoke development when tested in accord with ASTM E84.
    c. Formaldehyde-free.
    d. Assembly STC: As indicated on drawings.
    e. Thickness: As indicated on drawings.

B. Mineral Wool Sound Attenuation Batts and Blankets: ASTM C553, Type I through IV, unfaced, manufactured from thermosetting resins , and mineral fibers manufactured from basalt (volcanic rock).
1. Acceptable Products: Subject to compliance with requirements.
    a. MinWool 1200 Flexible Batt Insulation by Johns Manville, a Berkshire Hathaway Company. www.jm.com
    b. Rockwool by Roxul, Inc. www.rockwool.com
    c. Thermafiber SAFB by Owens-Corning Corp. www.owenscorning.com
2. Characteristics:
    a. Type: Paperless, unfaced, semi-rigid mineral wool fiber batt/blanket
    b. Density: Maximum 4.0 pcf for 1" thickness.
    c. Surface burning characteristics: Maximum 0 flame spread and 0 smoke development when tested in accordance with ASTM E84.
    d. Assembly STC: As indicated on Drawings.
    e. Formaldehyde-free.
    f. Thickness: As indicated on Drawings.

C. Acoustical Sealants for Permanently Exposed Joints: Paintable.
1. Provide acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies according to ASTM E90.

2. Manufacturer's standard paintable, single component (one part), nonsag, nonstaining, nonmigrating, latex based acoustical sealant.
3. Meets or exceeds the following specifications: UL 1479, UL 2079, ASTM E834, ASTM C919, ASTM E84, ASTM E90, flame spread-5, smoke developed-5.
    a. Designed to achieve a minimum Sound Transmission Class (STC) of 53 when applied in accordance with ASTM C919 - Standard Practice for use of Sealants in Acoustical Applications, with installation intended as two beads of sealant at the top, bottom and all perimeter edges.
4. Acceptable Products: Subject to compliance with requirements.
    a. BOSS 826 Acoustical Sound Sealant by Boss Products, a brand of Accumetric, LLC. www.accumetricinc.
    b. Acoustical Sealant GSC or GSCF by Grabber Construction Products. www.grabberpro.com
    c. OSI SC175 Acoustical Sound Sealant by OSI, a brand of the Henkel Corporation. www.ositough.com
    d. AIS-919 Acoustical and Insulation Latex Sealant by Pecora Corporation. www.pecora.com
5. Color: Manufacturer standard white for field painting.

D. Acoustical Sealant for Permanently Concealed Joints: Non-paintable.
1. Provide acoustical joint-sealant products that effectively reduce airborne sound transmission through perimeter joints and openings in building construction, as demonstrated by testing representative assemblies according to ASTM E90.
2. Manufacturer's standard nonsag, nondrying, nonhardening, nonskinning, nonstaining, gunnable, acoustical sealant.
3. Meets or exceeds the following specifications: UL 1479, UL 2079, ASTM E834, ASTM C919, ASTM E84, ASTM E90, flame spread-5, smoke developed-5.
    a. Designed to achieve a minimum Sound Transmission Class (STC) of 62 when applied in accordance with ASTM C919 - Standard Practice for use of Sealants in Acoustical Applications, with installation intended as two beads of sealant at the top, bottom and all perimeter edges.
4. Acceptable Products: Subject to compliance with requirements.
    a. BA-98 Sealant by Pecora Corporation. www.pecora.com
    b. Quiet Seal Pro by Pabco Gypsum. www.pabcogypsum.com
    c. Sheetrock Acoustical Sealant by USG Corporation. www.usg.com
5. Color: Manufacturer standard white or gray.

E. Acoustical Putty: Moldable, acoustical putty. For intumescent applications, refer to Section 07 8400 - Firestopping.
1. UL Classified, odorless, and water resistant.

2. Designed for use as sound insulation product with adhesion to typical substrate materials found on this project.
3. Non-hardening, permanently resilient.
4. In Service Temperature: -10 deg. F to 120 deg. F.
5. Meets or exceeds the following specifications: UL 1479, UL 2079, ASTM E834, ASTM C919, ASTM E84, ASTM E90, flame spread-5, smoke developed-5.
    a. Designed to achieve a minimum Sound Transmission Class (STC) of 62 when applied in accordance with ASTM C919 - Standard Practice for use of Sealants in Acoustical Applications, with installation intended as two beads of sealant at the top, bottom and all perimeter edges.
6. Acceptable Manufacturers: Subject to compliance with requirements.
    a. Acoustigard Sound and Vibration Control. www.acoustiguard.com
    b. Acoustical Solutions. www.acousticallsolutions.com
    c. Hilti North America. www.hilti.com
    d. Kinetics Noise Control. www.kineticsnoise.com
    e. Soundaway Corporation. www.soundaway.com
    f. Quiet Putty 380 by Pabco Gypsum. www.pabcogypsum.com

F. Acoustical Sealant Tape: Closed cell polyvinyl chloride foam tape.
1. Size: Minimum 1/4 inch thick by 1 inch wide. Size to fit application, trim as necessary.
2. Color: Colors as selected by Architect from manufacturer's full range of colors.
3. Products: Subject to compliance with requirements.
    a. Saint-Gobain Performance Plastics, Inc. Norseal V730. www.plastics.saint-gobain.com
    b. Soundaway Corporation, Inc. Neoprene Isolation Gasket PSA. www.soundaway.com
    c. Foamtapes.net, a division of LAMATEK, Inc. Foamtapes PolyVinyl Chloride (PVC) Foam 7 lb. www.foamtapes.net

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.

B. Layout openings for penetrations centered on the penetrating items.

3.03 INSTALLATION - SUSPENSION SYSTEM

A. General: Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this section.

1. Comply with building code for seismic requirements.
2. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
3. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size. Align grid members straight and perpendicular to walls.
4. Locate accessories, control joints and expansion joints before installing grid system.
5. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
6. Provide hanger clips during steel deck erection. Provide additional hangers and inserts as required.
7. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
8. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
9. Support fixture loads using supplementary hangers located within 6 inches (150 mm) of each corner, or support components independently.
10. Do not eccentrically load system or induce rotation of runners.

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers, only where required, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means. Coordinate with delegated-design requirements.
3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.

4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
8. Do not attach hangers to steel deck tabs.
9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
10. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.
11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

C. Perimeter and Edge Molding and Trim: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
1. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
2. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
3. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends. Miter corners accurately and connect securely.
4. Use longest practical lengths.
5. Do not use exposed fasteners, including pop rivets, on moldings and trim.

D. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

E. Where grid system exists in an unrestrained condition, brace back to building structure using hanger wire, main tee or carrying channel braces.

3.04 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function. Install acoustical panels to fit accurately into suspension-system runners and edge moldings.
   1. Exposed acoustical unit edges are not permitted.

C. Fit border trim neatly against abutting surfaces.

D. Install units after above-ceiling work is complete.

E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

F. Exposed Edges:
   1. Visible unfinished acoustical tile or panel edges are not permitted.

G. Cutting Acoustical Units:
   1. Avoid field cutting acoustical tile wherever possible. Install tile manufacturer custom panel sizes. Where field cutting is required, install tile manufacturer provided field touch up paint as specified.
   2. Cut to fit irregular grid and perimeter edge trim.
   3. Make field cut edges of same profile as factory edges.
   4. Scribe and cut panels at borders and penetrations to provide precise fit.
   5. Where round obstructions occur, provide preformed closures to match perimeter molding.

H. Arrange directionally patterned acoustical panels as indicated on reflected ceiling plans.

I. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.

J. Lay acoustical insulation for a distance of 48 inches (1200 mm) either side of acoustical partitions as indicated.

K. Install hold-down clips on each panel to retain panels tight to grid system; comply with seismic design requirements.
   1. Install impact and seismic clips in areas indicated; space according to panel manufacturer's written instructions unless otherwise indicated.
   2. Hold-Down Clips: Space Maximum 24 inches (610 mm) on all cross runners.

L. Install hold-down clips on panels within 20 ft (6 m) of an exterior door.

3.05 ERECTION TOLERANCES

A. Deflection: Suspension system components, hangers and fastening devices supporting lighting fixtures, ceiling grilles and acoustical units shall have maximum deflection of 1/360 of the span when tested in accord with ASTM C635.

B. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet (3 mm in 3.6 m), non-cumulative.

C. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3 mm in 3.6 m), non-cumulative.

D. Bow, camber and twist: Not exceeding tolerances established by ASTM C635.

3.06 FIRE AND SMOKE BARRIER IDENTIFICATION

A. Sub-ceilings required to have protected openings shall be identified with signs or stenciling in a manner acceptable to code officials.

1. Where identification is required to be provided locate as directed by code officials.
2. Provide lettering and coloring as directed by code officials.
3. Use wording nomenclature as directed by code officials.

3.07 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 09 5401

SPECIALTY CEILING ASSEMBLIES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Specialty ceiling assemblies.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Sequence work to ensure ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
2. Do not install units until after interior wet work is dry.
3. Schedule material installation to minimize need for removal and replacement of units to accommodate work of other trades.

B. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

1. Attendees shall include contractor, ceiling system installer, manufacturer technical representative, and installers of adjacent materials and systems.
2. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.04 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: For each type of product.

1. Anchoring, support, and suspension components.
2. Ceiling units.

C. Shop Drawings: Indicate configuration of system including size and location of ceiling units, transitions, interfaces with adjacent materials and systems, mounting configuration, mounting requirements, dimensions, and sizes.

1. Provide reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other.
   a. Ceiling support system members.

b. Structural members to which suspension systems will be attached.

c. Method of attaching hangers to building structure. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.

d. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.

e. Items penetrating ceiling and ceiling-mounted items including, but not limited to, the following:

1) Lighting fixtures.

2) Diffusers.

3) Grilles.

4) Speakers.

5) Sprinklers.

6) Access panels.

7) Perimeter moldings.

f. Location of sealants, as applicable.

g. Show operation of hinged and sliding components adjacent to ceiling units.

h. Minimum Drawing Scale: 1/8 inch = 1 foot (1:96).

2. Delegated-Design Submittal: For support of ceiling systems.

a. Include design calculations for system loads including seismic requirements with analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Samples for Selection: Provide manufacturer standard charts for selection of materials and finishes.

E. Ceiling Unit Samples for Verification: Submit two samples 12 by 12 inches in size illustrating selected material and finish of ceiling units.

F. Qualification Data: For testing agency.

G. Product Test Reports: For each ceiling system, for tests performed by a qualified testing agency.

H. Evaluation Reports: For each ceiling support system including anchor and fastener type, from ICC-ES.

I. Field quality-control reports.

1.05 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements.

C. Maintenance Data: Provide manufacturer parts lists, operation, and maintenance instructions for the materials of this Section.

D. Maintenance Materials: Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Ceiling Units: One carton or box of each type installed.
2. Suspension-System Components: One carton or box of each type installed.

1.06 QUALITY ASSURANCE

A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum three years documented experience.

B. Ceiling Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum three years documented experience.

1.07 MOCKUPS

A. Mockup: Provide a mockup for evaluation of installation, finishes, and workmanship.

1. Locate as directed by Architect.
2. Size: Minimum one fabricated unit of each type, in configuration directed by Architect.

B. Do not proceed with installation beyond mockup until the mockup installation is approved by Architect. Correct deficiencies and refinish mock-up area as required to produce acceptable work.

C. Subject to compliance with requirements, approved mockups may become part of the completed Work if accepted to remain by Architect and if undisturbed at time of Substantial Completion. Remove mockup when directed by Architect.

D. Approval of mockups does not constitute approval of deviations from the Contract Documents unless Architect specifically approves such deviations in writing.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver ceiling units , support system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing ceiling units, permit them to reach room temperature and a stabilized moisture content.

1.09 FIELD CONDITIONS

A. Maintain uniform temperature in accordance with manufacturer recommendations.

B. Environmental Limitations: Do not install ceiling systems until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.10 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.

1. Warranty Period: One year from date of Substantial Completion.

B. Special Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, where items fail to perform as designed and manufactured.

1. Warranty Period: Provide manufacturer standard warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS, GENERAL

A. Basis of Design: As indicated on Drawings.

1. Drawing Designation: SPC-1.
2. Fire Rating: ASTM E84 - Class A, UNE-EN 13501-1, B-s1,d0.
3. Suspension System: Cables, rods, brackets, and wire supports by ceiling manufacturer for project specific application.

2.02 ACCESSORIES

A. Provide accessories as needed for a complete support system installation. All accessories shall be sized to comply with applicable code requirements for structural and seismic design. Sizes listed shall be considered minimums and the most stringent requirement shall apply.

1. Provide accessories for ceiling grid system in compatible, non dissimilar, non corrosive metals.

B. Miscellaneous Support and Attachments: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E488/E488M or ASTM E1512 as applicable, conducted by a qualified testing and inspecting agency.

a. Corrosion Protection: Carbon-steel components zinc plated according to ASTM B633, Class SC 1 (mild) service condition.

b. Corrosion Protection: Stainless-steel components complying with ASTM F593 and ASTM F594, Group 1 Alloy 304 or 316.

c. Corrosion Protection: Components fabricated from nickel-copper-alloy rods complying with ASTM B164 for UNS No. N04400 alloy.

2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E1190, conducted by a qualified testing and inspecting agency.

3. Support Channels: Minimum 16 ga. cold-rolled steel, 1-1/2" deep.

4. Wire Hangers, Braces, and Ties: Provide wires as follows:

a. Zinc-Coated, Carbon-Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.

b. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C635/C635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.106-inch.

5. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.

6. Unistrut Supports: Steel channels, fittings, fasteners, hangers, pipe clamps, and accessories as part of a weldless system designed for support of suspended items complying with applicable codes including, but not limited to loads and siesmic resistance. Support sizes and thickness as required for project specific installation.

C. Finish for Permanently Exposed Field Finished Accessories: Hot dip galvanized factory finish, or factory primed aluminum, field painted in color selected by Architect.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of ceilings.

B. Examine units before installation. Reject units that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 INSTALLATION - SUSPENSION SYSTEM

A. General: Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this Section.

1. Comply with building code for seismic requirements.
2. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
3. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
4. Where ducts or other equipment prevent the regular spacing of supports, reinforce the nearest affected supports and related carrying channels to span the additional distance.

B. Suspend supports hangers from building's structural members and as follows:

1. Install plumb and free from contact with insulation or other objects that are not part of supporting structure or of ceiling system.
2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
3. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
4. When steel framing does not permit installation of supports at spacing required, install carrying channels or other supplemental support for attachment of supports.
5. Do not attach supports to steel roof deck. Attach hangers to structural members.
6. Size supplemental suspension members to support ceiling loads within performance limits established by referenced standards.

3.03 INSTALLATION - CEILING UNITS

A. Install in accordance with manufacturer's instructions.

B. Fit units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Install units after above-ceiling work is complete.

D. Install units level, in uniform plane, and free from twist, warp, and dents.

3.04 ERECTION TOLERANCES

A. Comply with manufacturer recommendations.

3.05 CLEANING

A. Clean exposed surfaces of units. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

B. Remove and replace components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 09 6514

RESILIENT BASE AND ACCESSORIES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplemental General Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Resilient base.

B. Resilient flooring transitions.

1.03 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

B. Attendees shall include contractor, resilient system installer, manufacturer technical representative, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.04 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

C. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.

1.05 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements.

C. Maintenance Data: Provide manufacturer maintenance instructions for the materials of this Section.

D. Maintenance Materials: Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. One carton or box of each type installed.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing specified materials with minimum 20 years documented experience.

B. Installer Qualifications: Company specializing in installing specified materials with minimum five years documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.

B. Store all materials off of the floor in an acclimatized, weather-tight space.

C. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

D. Protect roll materials from damage by storing on end.

E. Do not double stack pallets.

1.08 FIELD CONDITIONS

A. Maintain materials in area of installation at a temperature of 70 degrees F (21 degrees C) to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F (13 degrees C), in spaces to receive resilient products during the following periods:

1. Minimum 48 hours before installation.
2. During installation.
3. Minimum 48 hours after installation.

1.09 WARRANTY

A. Special Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, where items fail to perform as designed and manufactured.

1. Warranty Period: Minimum 10 years from date of Substantial Completion.

B. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.

1. Warranty Period: One year from date of Substantial Completion.

PART 2 PRODUCTS

2.01 PRODUCT REQUIREMENTS

A. Single-Source Responsibility for Products: Obtain each type and color of product specified from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.

B. Provide products and accessories necessary for a complete installed system.

C. All products shall comply with applicable code requirements for fire resistance and combustibility.

2.02 RESILIENT BASE

A. Product Selections: As indicated on Drawings.
   1. Drawing Designation: RB-1.
   2. Drawing Designation: RB-2.

B. Acceptable manufacturers subject to compliance with requirements:
   1. Burke Flooring: www.burkeflooring.com.
   2. Flexco Floors. www.flexcofloors.com
   3. Roppe Corporation. www.roppe.com
   4. Tarkett/Johnsonite. www.commercial.tarkett.com

C. Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset.
   1. Physical Characteristics:
      a. Manufactured from a proprietary thermoplastic rubber formulation.
      b. Meets performance requirements for ASTM F-1861, Type TP, Group 1.
      c. ASTM E 648, Standard Test Method for Critical Radiant Flux of 0.45 watts/cm2 or greater, Class I.
      d. Flexibility: Does not crack, break, or show any signs of fatigue when bent around a 1/4" (6.4 mm) diameter cylinder when tested according to ASTM F 137 Standard Test Method for Flexibility of Resilient Flooring Materials protocols.
      e. Fire Resistance: ASTM E 648 Critical Radiant Flux (NFPA 253): Class I.
      f. Color Stability: Meets or exceeds ASTM F 1861 requirements for color stability when tested to ASTM F 1515 Standard Test Method for Measuring Light Stability of Resilient Flooring protocols.
      g. Chemical resistance (ASTM F 925): Passes – 5% acetic acid, 70% isopropyl alcohol, mineral oil, 5% sodium hydroxide solution, 5% hydrochloric acid solution, 5% sulfuric acid solution, 5% household ammonia solution, and 5.25% household bleach solution.

h. Resistance to light (ASTM F 1515): < 8.

i. Phthalate, chlorine and halogen free

j. 100 percent Recyclable.

k. Manufacturing facilities shall be ISO 9001 and ISO 14001 Certified.

2. Length: Manufacturer standard; provide longest available length to minimize seams.

3. Profile: Provide straight or cove base as indicated on Drawings. Where not indicated, as selected by Architect.

4. Height: As indicated on Drawings. Where not indicated, as selected by Architect.

5. Accessories: Field fabricated external corners and internal corners. Premolded items not permitted.

6. Color: As indicated on Drawings. Where not indicated, as selected by Architect.

2.03 ACCESSORIES

A. Provide all accessories items from primary base manufacturer except where not available.

B. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by product manufacturer for applications indicated.

C. Adhesives: Water-resistant type recommended by product and adhesive manufacturers to suit base and substrate conditions indicated.

2.04 RESILIENT FLOORING TRANSITIONS

A. Moldings, Transition and Edge Strips:

1. Sizes: As dictated by flooring materials at transitions.

2. Profiles: As indicated on Drawings.

3. Physical Characteristics:

a. Transitions shall comply with A.D.A. requirements of Section 4.5.2 Changes of Level.

b. Standard formulation exceeds ASTM E 648 Class 1 Flammability requirements.

c. Designed for interior applications only.

4. Basis of Design: Tarkett Slim Line Transitions by Tarkett Company: www.johnsonite.com.

5. Acceptable manufacturers subject to compliance with requirements:

a. Burke Flooring: www.burkeflooring.com.

b. Roppe Corp: www.roppe.com.

c. Tarkett/Johnsonite. www.commercial.tarkett.com

B. Metal Transitions: Refer to Section 09 7000 - Metal Floor and Wall Transitions.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrates are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

B. Verify that required utilities in the materials installation area are in correct location.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 PREPARATION

A. Clean and prepare substrates in accordance with manufacturer's written instructions.

B. Prepare substrates for installation of resilient materials in accordance with Section 09 0561.

3.03 INSTALLATION - GENERAL

A. Starting installation constitutes acceptance of substrate conditions.

B. Install components and accessories in accordance with manufacturer's written instructions.

C. Adhesive-Applied Installation:

1. Spread only enough adhesive to permit installation of materials before initial set.
2. Fit joints and butt seams tightly.

3.04 INSTALLATION - RESILIENT BASE

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches (45 mm) between joints.

B. Provide maximum joint dimension as recommended by base manufacturer.

C. Miter internal corners. At external corners, 'V' cut back of base strip to 2/3 of its thickness and fold. Premolded items not permitted.

D. Install base on solid backing. Bond tightly to substrates.

E. Scribe and fit to door frames and other interruptions.

3.05 INSTALLATION - RESILIENT TRANSITIONS

A. Install in accordance with manufacturer instructions and recommendations.

B. Install transitions in one piece sections. Where more than one piece is required, fit joints tightly.

C. Provide maximum joint dimension as recommended by base manufacturer.

D. Miter internal corners. At external corners, use premolded units. At exposed ends, use premolded units.

E. Install transitions on solid backing. Bond tightly to substrates.

F. Scribe and fit to door frames and other interruptions.

3.06 CLEANING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean in accordance with manufacturer's written instructions.

C. Protect installed materials from damage or deterioration until date of Substantial Completion.

END OF SECTION

SECTION 09 6521

RESILIENT LVT-LVP FLOORING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Luxury tile and plank vinyl (LVT and LVP) composition flooring.

1.03 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

B. Attendees shall include contractor, LVT flooring installer, manufacturer technical representative, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.04 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: For each type of product.

C. Samples: For each exposed product and for each color and pattern specified.

D. Shop Drawings: Provide installation plans and details indicating location of transitions, seams, pattern orientation, and penetrations.

1.05 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements.

C. Maintenance Data: Provide manufacturer maintenance instructions for the materials of this Section.

D. Maintenance Materials: Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. One carton or box of each type installed.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation.

1.07 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.

1. Warranty Period: One year from date of Substantial Completion.

B. Special Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, including deterioration of wearing layer, where items fail to perform as designed and manufactured.

1. Warranty Period: Twenty years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 PRODUCTS, GENERAL

A. Provide products and accessories from a single manufacturer, unless noted otherwise, necessary to provide a complete system installation in accordance with specified requirements.

2.02 MANUFACTURERS

A. Product Selections: As indicated on Drawings.

1. Drawing Designation: LVT-1.

2.03 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

2.04 FLOORING TRANSITIONS

A. Refer to Section - 09 7000 - Metal Wall and Floor Transitions.

PART 3 EXECUTION

3.01 PREPARATION

A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare according to ASTM F710. Coordinate with the requirements of Section 09 0651 - Moisture Vapor Control Floor Preparation.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install floor tiles until materials are the same temperature as space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

F. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

C. Lay tiles square with room axis.

D. Lay tiles with grain running in one direction, unless indicated otherwise on Drawings.

E. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

F. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

G. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

H. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other non-permanent marking device.

I. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

J. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.03 CLEANING AND PROTECTION

A. Clean flooring in accordance with manufacturer recommendations immediately after complete installation.

B. Protect completed flooring installation from damage and soiling until date of Substantial Completion.

C. Remove protection and clean flooring in accordance with manufacturer recommendations immediately prior to date of Substantial Completion.

END OF SECTION

SECTION 09 6723

RESINOUS FLOORING AND WALL SYSTEMS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Resinous commercial flooring and wall systems for interior applications

1.03 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

B. Attendees shall include contractor, resinous flooring and wall system installer, manufacturer technical representative, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.04 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: For each type of product indicated. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring and wall system component required.

C. Shop Drawings: Provide project specific shop drawings showing locations and extent of flooring and wall system, and details of substrate joints and cracks, flashings, penetrations, and other termination and transition conditions.

D. Samples for Selection: Provide manufacturer standard literature for selection of the following.

1. Pigmented resin colors; for visible finish layers only.
2. Texture or broadcast aggregate colors; for visible finish layers only.
3. Pigmented sealer colors, for visible finish layers only when clear sealer is not used.
4. Slip resistant texture selections indicating range of slip resistant textures available.

E. Samples for Verification: For each resinous flooring and wall system required, 6 inches square, applied to a rigid backing by Installer for this Project. Cascade layers of flooring and wall system assembly and label as specified for identification.

F. Product Schedule: Use resinous flooring and wall system designations indicated in Part 2 and room designations indicated on Drawings in product schedule.

G. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.

H. Maintenance Data: For resinous flooring and wall system to include in maintenance manuals.

1.05 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements. Warranty shall be completed in Owner's name and registered with manufacturer.

C. Maintenance Data: Provide manufacturer maintenance instructions for the materials of this Section.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced installer (applicator) who is experienced in applying resinous flooring and wall systems similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance, and who is acceptable to resinous flooring and wall system manufacturer.

B. Source Limitations: Obtain primary resinous flooring and wall system materials, including primers, resins, hardening agents, grouting coats, and topcoats, through one source from a single manufacturer, with not less than ten years of successful experience in manufacturing and installing principal materials described in this section. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.

C. Manufacturer Field Technical Service Representatives: Resinous flooring and wall system manufacturer shall retain the services of Field Technical Service Representatives who are trained specifically on installing the system to be used on the project. Field Technical Services Representatives shall be employed by the system manufacture to assist in the quality assurance and quality control process of the installation and shall be available to perform field problem solving issues with the installer.

1.07 MOCKUPS

A. Mockup: Provide a mockup for evaluation of installation, finishes, and workmanship.
   1. Locate as directed by Architect.
   2. Size: Minimum 25 square feet in configuration directed by Architect.
      a. Apply full-thickness. Include 48 inch length of integral cove base.
   3. Simulate finished lighting conditions for Architect's review of mockups

B. Do not proceed with installation beyond mockup until the mockup installation is approved by Architect.

C. Subject to compliance with requirements, approved mockups may become part of the completed Work if accepted to remain by Architect and if undisturbed at time of Substantial Completion.

D. Approval of mockups does not constitute approval of deviations from the Contract Documents unless Architect specifically approves such deviations in writing.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

B. Store materials to prevent deterioration from moisture, heat, cold, direct sunlight, or other detrimental effects.

C. All materials used shall be factory pre-weighed and pre-packaged in single, easy to manage batches to eliminate on site mixing errors. No on site weighing or volumetric measurements allowed.

1.09 PROJECT CONDITIONS

A. Environmental Limitations: Comply with resinous flooring and wall system manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring and wall system application.

B. Maintain material and substrate temperature between 65 and 85 deg F (18 and 30 deg C) during resinous flooring and wall system application and for not less than 24 hours after application.

C. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring and wall system application.

D. Close spaces to traffic during resinous flooring and wall system application and for not less than 24 hours after application, unless manufacturer recommends a longer period.

E. Concrete substrate shall be properly cured for a minimum of 30 days. A vapor barrier shall be present for concrete subfloors on or below grade. Otherwise, an osmotic pressure resistant grout shall be installed prior to the resinous flooring and wall system.

F. Substrates Conditions: Concrete substrate shall be dense, free of voids, fins, honeycombs and other imperfections. Horizontal surfaces shall have a “once over” steel trowel finish (wood float, broom or machine trowel finishes are unacceptable). Finish concrete to the required grade, less allowance for overlayment thickness. A vapor barrier shall be present for concrete on or below grade to prevent osmotic pressure forces from affecting adhesion of

overlayment. Cure concrete 30 days minimum and conduct the following tests prior to application of overlayment:

1. Test for “bird baths,” if complete drainage is critical, by flooding horizontal surfaces with water and marking unacceptable areas. Unacceptable areas are to be corrected prior to application of overlayment.
2. Test for unacceptable moisture content in concrete by the “plastic sheet” method (Ref. ASTM D-4263). The number of test sites shall be representative of the scope of work.
3. Test for acceptable concrete surface tensile strength of 200 psi minimum by using a “pull-out test” (Ref. ASTM D7234) in which a 1.0 inch diameter hole is cut into the concrete. Using a polymer adhesive, glue a 0.8 inch diameter dolly to the area cut in the concrete. The number of test sites shall be representative of the scope of work.
4. All patching and repair materials must be compatible with the overlayment and must be tested for acceptable surface tensile strength of 200 psi minimum by using pull-out test. The number of test sites shall be representative of the scope of work.
5. Test for substrate temperature by using a surface dial thermometer or equal. Temperature shall be within temperature parameters recommended by the lining material manufacturer.
6. Inspect for contamination, such as oil, grease, or chemical spills. Contamination must be removed prior to application of lining.

G. Coordinate with the requirements of Section 09 0561 - Moisture Vapor Control Floor Preparation.

1.10 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this section.
   1. Warranty Period: One year from date of Substantial Completion.

B. Special Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, where items fail to perform as designed and manufactured.
   1. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS, EPOXY RESINOUS COMMERCIAL FLOORING SYSTEM.

A. Basis of Design: Products as indicated by The Tnemec Company. www.tnemec.com

B. System Selection: Commercial Light Duty System by The Tnemec Company. www.tnemec.com
   1. Drawing Designation: EPF-1, EPW-1.
   2. Characteristics:
      a. Seamless Decorative Quartz Floor, Tnemec Series N241/224/284/248.

b. Overall System Thickness: Nominal 5 mm (3/16 inch).

c. Integral Cove Base: 6 inch high with cove strip, unless noted otherwise.

d. Waterproofing: Provide assembly with integral waterproofing layer.

3. System Configuration:

a. Urethane Cement/Primer - Series N241 applied approximately 90-100 square feet per kit.

1) Quartz broadcast to refusal to achieve 1/8” thickness.

b. Broadcast Coat: Series 224 Deco-Flake applied approximately 80 square feet per gallon.

1) Flakes: Broadcast to refusal to achieve 1/16” thickness.

c. Grout/Seal Coat: Series 284 Deco-Clear applied 100-115 square feet per gallon

d. Finish Coat: Series 248 EverThane.

2.02 ACCESSORY MATERIALS

A. Sloping and Leveling: Use flooring and wall system manufacturer provided or recommended materials designed for permanent repairs under flooring and wall system.

B. Primer: Type recommended by manufacturer for substrate and body coats indicated.

C. Patching and Fill Material: Resinous product of or approved by resinous flooring and wall system manufacturer and recommended by manufacturer for application indicated.

D. Joint Sealant and Crack Treatment: Type recommended or produced by resinous flooring and wall system manufacturer for type of service and joint condition indicated.

E. Waterproofing Membrane: Type recommended by manufacturer for substrate and primer and body coats indicated. Provide textured broadcast material as recommended by system manufacturer for intercoat adhesion. Comply with manufacturer recommendations.

2.03 FLOORING TRANSITIONS

A. Refer to Section - 09 7000 - Metal Wall and Floor Transitions.

PART 3 EXECUTION

3.01 EXAMINATION

A. The Applicator shall examine the areas and conditions under which the resinous floor coating Work is to be performed in accordance with NACE SP0892 and SSPC-SP13/NACE No. 6, and notify Architect in writing of conditions detrimental to the proper and timely completion of the Work.

B. All concrete should be cured using the procedures described in ACI 308, allowing a minimum of 28 days at 75 deg F.

C. The Applicator shall confirm the presence of a vapor barrier to protect against the effects of moisture vapor transmission.

D. Commencement of the Work of this Section shall indicate that the substrate and other conditions of installation are acceptable to the Contractor and his Applicator, and will produce a finished product meeting the requirements of the Specifications. Defects resulting from accepted conditions shall be corrected by the Applicator at their own expense.

3.02 SURFACE PREPARATION

A. General: Prepare and clean substrates according to resinous flooring and wall system manufacturer's written instructions for substrate indicated. Provide clean, dry, and neutral Ph substrate for resinous flooring and wall system application.

B. Equipment: Utilize manufacturer recommended and provided equipment for installation.

C. Concrete surfaces to receive resinous floor coatings shall be poured with a Smooth Troweled Finish in accordance with ACI 301.

D. All surfaces must be clean, dry and free of oil, grease and other contaminants, prior to preparation in accordance with NACE No. 6/SSPC-SP13. Concrete surfaces must be sound and capable of supporting the resinous floor coating system.

E. Prepare concrete surfaces in accordance with NACE No. 6/SSPC-SP13 Joint Surface Preparation Standards and ICRI Technical Guidelines. Shot-blast or mechanically abrade concrete surfaces to remove laitance, curing compounds, hardeners, sealers, existing coatings, and other contaminants and to provide the recommended ICRI-CSP Profile.

F. Cracks, voids and other surface imperfections should be filled with the recommended filler or surfacer prior to the installation of the materials.

G. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through the resinous floor coating system according to manufacturer's written recommendations.

H. Install Waterproofing membrane system in accordance with manufacturer’s written installation instructions.

3.03 APPLICATION

A. General: Apply components of resinous flooring and wall system system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.

1. Coordinate application of components to provide optimum adhesion of resinous flooring and wall system system to substrate, and optimum intercoat adhesion.
2. Cure resinous flooring and wall system components according to manufacturer's written instructions. Prevent contamination during application and curing processes.

3. At substrate expansion and isolation joints, provide joint in resinous flooring and wall system to comply with resinous flooring and wall system manufacturer's written recommendations.
4. Apply joint sealant to comply with manufacturer's product data.
5. Apply each material at not less than manufacturer's recommended spreading rate. Provide total cured material thickness indicated or as recommended in writing by manufacturer.

B. Apply primer where required by resinous system, over prepared substrate at manufacturer's recommended spreading rate.

C. Integral cove base: Provide cove base with cover strip at height indicated. Apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's product data and details including those for taping, mixing, priming, troweling, sanding, of cove base. Round internal and external corners.

D. Flooring installation: Install each type of resinous system material in strict accordance with manufacturer's installation instructions.

E. Wall System Installation: Install each type of resinous system material in strict accordance with manufacturer's installation instructions. Additional requirements to be determined.

F. Hole Filler: Mix and apply hole filler as part of the priming in strict accordance with manufacturer’s installation procedure.

G. Inside Radius: Mix and apply radius filler material forming a minimum 1/2 inch radius in strict accordance with manufacturer’s installation procedures.

H. Terminations:
1. Chase edges to lock flooring system into concrete substrate along lines of termination. Provide manufacturer's standard transition strip at terminations adjacent to other floor finish materials.
2. Penetration treatment: Lap and seal the flooring system onto the perimeter of the penetrating item by bridging over compatible elastomer at the interface to compensate for possible movement.
3. Treat floor drains by chasing the flooring system to lock in place at point of termination.

I. Joints and Cracks:
1. Treat control joints to bridge potential cracks and to maintain monolithic protection.
2. Treat cold joints and construction joints to bridge potential cracks and to maintain monolithic protection on horizontal and vertical surfaces as well as horizontal and vertical interfaces.
3. Discontinue floor coating system at vertical and horizontal contraction and expansion joints by installing backer rod and compatible sealant after coating installation is completed. Provide sealant type recommended by manufacturer for traffic conditions and chemical exposures to be encountered.

J. Corners:

1. Inside corners shall be treated with either an elastomeric or epoxy mortar radius (typically 1/2 inch minimum, verify with manufacturer) prior to application of the system.
2. Outside corners shall be ground to remove sharp corners as part of surface preparation.

3.04 FIELD QUALITY CONTROL, INSPECTION AND TESTING

A. The Applicator shall perform the quality control procedures listed below in conjunction with the requirements of this Section.

B. Inspect materials upon receipt to ensure that they are supplied by the approved Manufacturer.

C. Surface Profile: Inspect and record substrate profile (anchor pattern). Surfaces shall be profiled equal to the required CSP amplitude as recommended by the resinous floor coating manufacturer in accordance with ICRI Guideline 310.2 and SSPC-SP13/NACE No. 6.

1. Compare and record the substrate profile once every 50 square feet with the Concrete Surface Profile (CSP) comparators in accordance with ICRI Guideline No. 310.2.

D. Surface Cleanliness: Prepared concrete surfaces shall be inspected for surface cleanliness after cleaning and drying, prior to resurfacing or coating application.

E. Concrete Moisture Testing: After surface preparation verify concrete dryness in accordance with ICRI Guideline 310.2 and SSPC-SP13/NACE No. 6 and the following test methods.

1. ASTM F1869 – Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
   a. Moisture vapor transmission not to exceed twenty pounds per 1,000 square feet in a 24 hour period.
2. ASTM F2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
   a. Relative humidity not to exceed 99 percent.
3. Consult manufacturer regarding questions and or recommendations in reference to moisture problems.

F. Measure and record ambient air temperature, relative humidity and dew point temperature once every two hours of each work shift.

G. Measure and record substrate temperature once every two hours using an infrared or other surface thermometer.

H. Dry-Film Thickness shall be determined using a surface area calculation for material consumption.

I. The Applicator is responsible for keeping the Architect informed of progress so that Architect may provide additional quality control at his discretion.

J. Inspection by the Architect or others does not absolve the applicator from his responsibilities for quality control inspection and testing as specified herein or as required by the Manufacturer's instructions.

K. Material Sampling: Owner may require material samples for testing for compliance with requirements.

1. Owner will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in the presence of Contractor.
2. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.
3. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reapply flooring and wall system materials to comply with requirements.

3.05 MANUFACTURER’S FIELD SERVICES

A. Manufacturer’s technical representative shall provide technical assistance and guidance for surface preparation and application of coating systems.

3.06 CURING, PROTECTION AND CLEANING

A. Cure resinous flooring and wall system materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process. Close area of application to all foot traffic for a minimum of 24 hours after final coat.

B. Protect resinous flooring and wall system materials from damage and wear during remaining construction operations. Temporary covering is required over all new flooring and wall system after installation of resinous flooring systems and shall be maintained until Substantial Completion. Consult flooring and wall system manufacturer for type of floor protection to use and comply with manufacturer's recommendations for protective materials used and method of application to avoid damage to flooring and wall system.

C. Provide final cleaning of resinous flooring and wall system just prior to final inspection. Use cleaning materials and procedures as recommended by resinous flooring and wall system manufacturer.

END OF SECTION

SECTION 09 6813

TILE CARPETING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Carpet tile, adhered.

1.03 RELATED REQUIREMENTS

A. Section 09 0561 - Moisture Vapor Control Floor Preparation.

1.04 REFERENCE STANDARDS

A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

B. CRI 104 - Standard for Installation of Commercial Carpet.

1.05 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

B. Attendees shall include contractor, carpeting installer, manufacturer technical representative, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.06 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.

C. Shop Drawings: Indicate layout of seams, direction of carpet pile, patterns, and location of edge transitions.

D. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.

E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions.

F. Concrete Sub-floor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports.

1.07 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Manufacturer Warranty: Executed warranty meeting specified requirements.

C. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. Extra Carpet Tiles: One box or carton of each color and pattern installed.

1.08 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum ten years documented experience.

B. Installer Qualifications: Company specializing in installing carpet tile with minimum five years documented experience and approved by carpet tile manufacturer.

C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this Section.

1.09 FIELD CONDITIONS

A. Store materials in area of installation for minimum period of 24 hours prior to installation.

B. Maintain conditions in accordance with manufacturer instructions.

1.10 WARRANTY

A. Special Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, where items fail to perform as designed and manufactured.

1. Warranty Period: Provide manufacturer standard warranty.

B. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.

1. Warranty Period: One year from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Product Selections: As indicated on Drawings.

1. Drawing Designation: CPT-1.

2. Drawing Designation: CPT-2.

B. Provide products and accessories from a single manufacturer, unless noted otherwise, necessary to provide a complete system installation in accordance with specified requirements.

2.02 FLOORING TRANSITIONS

A. Refer to Section - 09 7000 - Metal Wall and Floor Transitions.

2.03 ACCESSORY MATERIALS

A. General: Coordinate with the requirements of Section 09 0561 - Moisture Vapor Control Floor Preparation. Provide accessories necessary for a complete system installation in accordance with specified requirements.

B. Adhesives: Compatible with materials being adhered; maximum VOC content of 50 g/L; CRI (GLP) certified; in lieu of labeled product, independent test report showing compliance is acceptable.

1. Use flooring manufacturer provided or recommended materials designed for use repairs under flooring system for project specific application.

C. Sloping and Leveling: Use flooring manufacturer provided or recommended materials designed for use repairs under flooring system for project specific application.

D. Primer: Use flooring manufacturer provided or recommended materials designed for use repairs under flooring system for project specific application.

E. Patching and Fill Material: Use flooring manufacturer provided or recommended materials designed for use repairs under flooring system for project specific application.

F. Joint Sealant and Crack Treatment: Use flooring manufacturer provided or recommended materials designed for use repairs under flooring system for project specific application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive carpet tile.

C. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to sub-floor surfaces.

D. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for flooring installation by testing for moisture and pH.

1. Test in accordance with Section 09 0561.
2. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.

E. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 PREPARATION

A. Prepare floor substrates for installation of flooring in accordance with Section 09 0561.

B. Allow carpet, accessories, and installation materials to acclimate to installation area environment prior to installation in accordance with installation requirements.

3.03 INSTALLATION - GENERAL

A. Starting installation constitutes acceptance of sub-floor conditions.

B. Install carpet and accessories in accordance with manufacturer's instructions and CRI 104 (Commercial).

C. Verify carpet match before cutting to ensure minimal variation between dye lots.

D. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay tiles square with room axis.

E. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

F. Extend tiles into toe spaces, door reveals, closets, and similar openings. Extend tiles to center of door openings.

G. Lay out carpet and locate seams in accordance with shop drawings.

1. Locate seams in area of least traffic, out of areas of pivoting traffic, and parallel to main traffic.
2. Do not locate seams perpendicular through door openings.
3. Align run of pile in same direction as anticipated traffic and in same direction on adjacent pieces.
4. Locate change of color or pattern between rooms under door centerline.
5. Provide monolithic color, pattern, and texture match within any one area.

H. Install carpet tight and flat on subfloor, well fastened at edges, with a uniform appearance.

I. Adhere tile to substrate in accordance with manufacturer instructions.

3.04 CLEANING AND PROTECTION

A. Remove excess adhesive from floor and wall surfaces without damage. Where surfaces are damaged, repair or replace.

B. Clean and vacuum carpet surfaces immediately after completed installation.

C. Protect installed carpet systems from damage and soiling until date of Substantial Completion.

D. Remove protection, clean and vacuum carpet surfaces just prior to date of Substantial Completion.

END OF SECTION

SECTION 09 7000

METAL WALL AND FLOOR TRANSITIONS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Miscellaneous interior metal floor and wall transitions, trim, and reveal components.

1.03 REFERENCES

A. AAMA 607.1 Guide Specification and Inspection Methods for Clear Anodized Finishes.

B. AAMA 609 and 610 Cleaning and Maintenance Guide for Architecturally Finished Aluminum.

C. ASTM B221 Standard Specification for Aluminum and Aluminum Alloy Extruded Bars, Rods, Profiles and Tubes.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

B. Attendees shall include contractor, trim installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Indicate product description, including compliance with specified requirements and installation requirements. Mark manufacturer's brochures to include only those products proposed for use.

1. Indicate location for use. Provide annotated floor plan showing locations.
2. Indicate special conditions and conflicts with substrates and adjacent materials not complying with manufacturer instructions, recommendations, and guidelines.

C. Shop Drawings: Provide project specific detail drawings indicating installation configurations, dimensions, materials, and finishes.

1. Indicate adjacent materials and finishes where transition is to be installed.

D. Samples for Initial Selection: For units with factory-applied color finishes. Provide manufacturer standard printed color charts for selection.

E. Samples for Verification: Following initial selection, for each type of exposed finish required, in manufacturer's standard sizes provide the following only when requested by Architect.

1.06 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements.

C. Maintenance Data: Provide manufacturer parts lists, operation, and maintenance instructions for the materials of this Section.

1.07 QUALITY ASSURANCE

A. Allowable tolerances in horizontal planes:

1. Variation from level: +1/8" in 12'-0".
2. Variation in plane of adjacent wallboard panels prior to joint treatment: 1/16".

B. Allowable tolerances in framed vertical construction.

1. Position: +1/4" maximum variation from design position.
2. Alignment: 1/8" in 8'-0"; 1/4" maximum in any continuous wall, line or surface.
3. Surface smoothness: No joint or fastener location, roughness or blemish discernible after application of finish when viewed at any angle from a distance of 5'-0" under occupancy lighting conditions, with surface preparation as specified in Painting section.

1.08 DELIVERY, STORAGE AND HANDLING

A. Stack accessories off floor on pallets or similar platforms providing continuous support for accessories to prevent sagging. Stack accessories so that long lengths are not over short lengths.

B. Do not overload floor systems.

C. Handle materials to prevent damage to surfaces, edges and ends of sheet metal items. Reject and remove damaged material from site.

1.09 WARRANTY

A. Special Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, where items fail to perform as designed and manufactured.

1. Warranty Period: One year from date of Substantial Completion.

B. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.

1. Warranty Period: One year from date of Substantial Completion.

PART 2 PRODUCTS

2.01 PROFILES AND CONFIGURATIONS

A. Locations: As indicated on Drawings and as selected by Architect.

B. Selections: As indicated on Drawings and as selected by Architect.

2.02 MANUFACTURERS, TRANSITIONS AT FLOORING AND WALL ASSEMBLIES

A. Metal Transitions for Walls:
1. Applications: As indicated on Drawings.
2. Sizes: As dictated by materials at transitions.
3. Profiles: As indicated on Drawings.
4. Material: As indicated on Drawings.
5. Finish: As indicated on Drawings.
6. Basis of Design: Schluter Systems, Inc. www.schluter.com

B. Metal Transitions for Floors:
1. Transitions shall comply with A.D.A. requirements of Section 4.5.2 Changes of Level.
2. Applications: As indicated on Drawings.
3. Sizes: As dictated by materials at transitions.
4. Profiles: As indicated on Drawings.
5. Material: As indicated on Drawings.
6. Finish: As indicated on Drawings.
7. Basis of Design: Schluter Systems, Inc. www.schluter.com

2.03 MANUFACTURERS, TRANSITIONS AT GYPSUM BOARD WALLS AND CEILINGS

A. Refer to Section 09 2116 - Gypsum Board Assemblies, for reveals, trims, and transitions.

2.04 MATERIALS

A. Material selections as indicated on Drawings and complying with the requirements of this Section.

B. Aluminum shall be extruded alloy 6063 T5 in factory finish indicated.

C. Stainless Steel: Type 304 stainless steel in No. 4 Brush Finish, unless indicated otherwise.

D. Brass:
1. ASTM B36/B36M - Standard Specification for Brass Plate, Sheet, Strip, And Rolled Bar.

2. ASTM B135 - Standard Specification for Seamless Brass Tube.

2.05 FINISHES, GENERAL

A. Color finish selections and types as indicated on Drawings and complying with the requirements of this Section.

2.06 ALUMINUM FINISHES - ANODIZED

A. Clear Anodized Finish:
   1. Manufacturer standard Architectural 200R1 medium etch (AA-M32c10A21), clear color.

B. Color Anodized finish:
   1. Coated with impregnated color.
      a. Buffed Satin (AA-M22C22A23)
      b. Buffed Brite (AA-M22C31A23)
      c. Brushed Brite (AA-M33C32A23)
   2. Thickness of anodic coating shall be tested in accordance with ASTM B244 and sealed to pass modified die stain test ASTM B136.
   3. Color: As indicated on Drawings. Where not indicated, as selected by Architect from manufacturer's full range.

C. Special Order color anodized finish:
   1. Coated with impregnated color.
      a. Buffed Satin (AA-M22C22A23)
      b. Buffed Brite (AA-M22C31A23)
      c. Brushed Brite (AA-M33C32A23)
   2. Thickness of anodic coating shall be tested in accordance with ASTM B244-97 and sealed to pass modified die stain test ASTM B136.
   3. Color: As selected by architect from manufacturer's full range.

2.07 ALUMINUM FINISHES - FACTORY PAINTED

A. Standard Powder Finish: Interior locations.
   1. Powder Coated Factory Paint Finish: Manufacturer standard backed on powder paint, applied over chemical conversion coating and primer, designed for durability in interior and exterior applications.
   2. Characteristics:
      a. All surfaces to receive a polyester powder coat will be pretreated in strict accordance with the powder coating manufacturer's specification.

b. Finish total dry film thickness should meet or exceed the dry film thickness of 30 microns/ 1.2 mils as specified in AAMA 2605 SEC 4.3. Color uniformity will meet or exceed the requirements of AAMA 2605 SEC 7.1

2.08 FINISHES - FACTORY COATED AND PRIMED FOR FIELD FINISHING

A. Color finish selections and types as indicated on Drawings and complying with the requirements of this Section.

B. Chemical Conversion Coating Primer: A a multi-step cleaning and metal preparation process to clean the aluminum, and acts as a protective coating until primer and paint can be applied.

1. Characteristics: Treat aluminum moldings to conform with ASTM D 1730 Type B and MIL-C- 5541A.

2.09 STAINLESS STEEL FINISHES

A. No. 4 Brushed Satin. No additional field applied finishes required.

2.10 FACTORY PRIMED FOR FIELD FINISHING

A. Color finish selections and types as indicated on Drawings and complying with the requirements of this Section.

B. Manufacturer standard paint primer is spray applied in the factory and baked-on for finish painting in the field.

C. Characteristics: Factory sprayed and baked-on to serve as a base for field painting.

2.11 OTHER FACTORY FINISHES

A. In accordance with manufacturer standard for material and finish indicated.

2.12 ACCESSORIES

A. Provide manufacturer standard welded prefabricated miters, transitions and intersections to match specified profiles.

B. Fasteners: Provide exposed fasteners as recommended by trim manufacturer.

2.13 FABRICATION

A. Factory fabricated. All edges ground smooth.

B. Fabricate custom miters and intersections. All edges ground smooth.

PART 3 EXECUTION

3.01 EXAMINATION

A. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 INSTALLATION

A. Install transitions, trims and accessories in accordance with manufacturer's product data and as indicated on Drawings.

3.03 PROTECTION

A. Protect accessories from damage until date of Substantial Completion. Replace items which become damaged.

END OF SECTION

SECTION 09 7200

WALL COVERINGS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Wall coverings.

1.03 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

B. Attendees shall include contractor, wall coverings installer, manufacturer technical representative, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.04 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Provide data on wall covering and adhesive. Include data for all accessories.

C. Shop Drawings: Indicate wall elevations with seaming layout.

D. Samples: For each type of wall covering and for each color, pattern, texture, and finish specified, full width by 24-inches long in size.

E. Test Reports: Indicate verification of flame and smoke ratings, when tested by UL.

F. Manufacturer's Installation Instructions: Indicate special procedures.

G. Manufacturer's Qualification Statement.

H. Installer's Qualification Statement.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum ten years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.

1.06 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements.

C. Maintenance Data: Submit data on cleaning, touch-up, and repair of covered surfaces.

D. Maintenance Materials: Furnish the following for Owner's use.

1. Extra Wall Covering Materials: 25 linear feet (8 linear m) of each color and pattern of wall covering; store where directed.
2. Package and label each roll by manufacturer, color and pattern, and destination room number.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Inspect roll materials at arrival on site, to verify acceptability.

B. Protect packaged adhesive from temperature cycling.

C. Do not store roll goods on end.

D. Follow manufacturer instructions for delivery, storage, and handling.

1.08 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the adhesive or wall covering product manufacturer.

B. Maintain these conditions 24 hours before, during, and after installation of adhesive and wall covering.

C. Follow manufacturer instructions.

1.09 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer Warranty: Provide standard manufacturer warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Product Selections: As indicated on Drawings.

1. Drawing Designation: WC-1.

B. Performance and Technical Requirements: As indicated by basis of design selections.

2.02 PRODUCTS, GENERAL

A. Provide products and accessories from a single manufacturer, unless noted otherwise, necessary to provide a complete system installation in accordance with specified requirements and in compliance with Owner requirements.

B. Provide products as indicated on drawings, schedules, and in compliance with Owner standard product selection requirements.

2.03 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
    a. Flame-Spread Index: 25 or less.
    b. Smoke-Developed Index: 450 or less.
2. Fire-Growth Contribution: No flashover and heat and smoke release according to NFPA 265.

2.04 ACCESSORIES

A. Provide accessories necessary for a complete system installation in accordance with specified requirements and in compliance with Owner requirements.

B. Substrate Filler: As recommended by adhesive and wall covering manufacturers; compatible with substrate.

C. Adhesive: Mildew-resistant, nonstaining, strippable adhesive, for use with specific wall covering and substrate application indicated and as recommended in writing by wall-covering manufacturer.

D. Primer/Sealer: Mildew resistant, as recommended in writing by primer/sealer and wall-covering manufacturers for intended substrate.

PART 3 EXECUTION

3.01 EXAMINATION

A. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 PREPARATION

A. Comply with manufacturer's written instructions for surface preparation.

B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, mildew, and incompatible primers.

C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.

1. Gypsum board: Prime with primer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer. Ensure gypsum board has been finished to the level appropriate for wall finish, in accordance with finishing requirements of interior gypsum board specification section requirements.

a. Refer to Section 09 2116 - Gypsum Board Assemblies.

D. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

3.03 INSTALLATION

A. Comply with manufacturers' written installation instructions applicable to products and applications indicated.

END OF SECTION

SECTION 09 7900

REINFORCED PLASTIC WALLCOVERING-FRP

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Fiberglass reinforced plastic sheet paneling.

1.03 REFERENCES

A. American Society for Testing and Materials: Standard Specifications (ASTM).
   1. ASTM D256 - Izod Impact Strengths (ft #/in).
   2. ASTM D570 - Water Absorption (%).
   3. ASTM D638 - Tensile Strengths (psi) & Tensile Modulus (psi).
   4. ASTM D790 - Flexural Strengths (psi) & Flexural Modulus (psi).
   5. ASTM D2583 - Barcol Hardness.
   6. ASTM D5319 - Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels.
   7. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

B. Attendees shall include contractor, plastic paneling installer, manufacturer technical representative, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Submit sufficient manufacturer's data to indicate compliance with these specifications, including:
   1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations.
3. Indicate compatibility with intended substrates.
4. Provide manufacturer installation instructions for complete system.

C. Shop Drawings: Submit elevations of each wall showing proposed seams and location of paneling and trim members with respect to all discontinuities in the wall elevation.

D. Selection Samples: Submit manufacturer's standard color pattern selection samples representing manufacturer's full range of available colors and patterns.

E. Samples for Verification: Submit appropriate section of panel for each finish selected indicating the color, texture, and pattern required.
1. Submit complete with specified applied finish.
2. For selected patterns show complete pattern repeat.
3. Exposed Molding and Trim: Provide samples of each type, finish, and color.

1.06 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements.

C. Special Manufacturer Finish Warranty: Executed warranty meeting specified requirements.

D. Maintenance Data: Provide manufacturer parts lists, operation, and maintenance instructions for the materials of this Section.

1.07 QUALITY ASSURANCE

A. Conform to building code requirements for interior finish for smoke and flame spread requirements as tested in accordance with ASTM E84 (Method of test for surface burning characteristics of building Materials). Class A rated.

B. Sanitary Standards: System components and finishes to comply with:
1. United States Department of Agriculture (USDA) / Food Safety & Inspection Services (FSIS) requirements for food preparation facilities, incidental contact.
2. Food and Drug Administration (FDA) Food Code 6-101.11.

1.08 DELIVERY, STORAGE AND HANDLING

A. Follow manufacturer instructions and deliver materials factory packaged on structurally sound pallets.

B. Store panels and trim lying flat, under cover and protected from the elements. Allow panels to acclimate to room temperature (range of 60 to 75°F) for 48 hours prior to installation.

1.09 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install plastic paneling until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.10 WARRANTY

A. Special Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, where items fail to perform as designed and manufactured.
   1. Warranty Period: Two years from date of Substantial Completion.

B. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.
   1. Warranty Period: Two years from date of Substantial Completion.

C. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace plastic panel system components that show evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Warranty Period: Ten years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Source Limitations: Obtain plastic paneling and trim accessories from single manufacturer.

2.02 PLASTIC SHEET PANELING - COMMERCIAL, LIGHT DUTY USE

A. Basis of Design: Marlite Standard FRP Type FR by Marlite, Inc. www.marlite.com
   1. Drawing Designation: FRP-1.

B. Acceptable Manufacturers: Subject to compliance with requirements.
   1. Crane Composites, Inc.
   2. Glasteel.
   3. Marlite.
   4. Newcourt, Inc.
   5. Nudo Products, Inc.
   6. Parkland Plastics, Inc.

C. Characteristics:
   1. Thickness: 0.090“ (2.29mm) nominal.

2. Fiberglass reinforced thermosetting polyester resin panel sheets complying with ASTM D5319.
3. Panels shall be USDA accepted for incidental food contact.
4. Coating: Multi-layer print, primer and finish coats or applied over-layer.
5. Tolerance:
    a. Length and Width: +/-1/8 " (3.175mm).
    b. Square - Not to exceed 1/8 " for 8 foot (2.4m) panels or 5/32 " (3.96mm) for 10 foot (2.4m) panels.
6. Properties: Resistant to rot, corrosion, staining, denting, peeling, and splintering.
    a. Flexural Strength - 1.0 x 104 psi per ASTM D790. (7.0 kilogram-force/square millimeter).
    b. Flexural Modulus - 3.1 x 105 psi per ASTM D790. (217.9 kilogram-force/square millimeter).
    c. Tensile Strength - 7.0 x 103 psi per ASTM D638. (4.9 kilogram-force/square millimeter).
    d. Tensile Modulus - 1.6 x 105 psi per ASTM D638. (112.5 kilogram-force/square millimeter).
    e. Water Absorption - 0.72% per ASTM D570.
    f. Izod Impact Strength of 72 ft. lbs./in ASTM D256.
7. Back Surface: Smooth. Imperfections which do not affect functional properties are not cause for rejection.
8. Fire Rating: Class A.
9. Size: As indicated on Drawings.

D. Base:
1. Marlite Base Molding for 0.090" (2.29mm) thick FRP Panels.

E. Moldings:
1. SaniSeal Trim: Co-extruded, dual-durometer polypropylene/monprene profiles with Dual-Seal Technology and high-performance pressure sensitive adhesive.
    a. Color: As selected by Architect from full range.
2. Outside Corner Guard: As selected by Architect from manufacturer full range.

F. Front Finish: Pebbled texture.

G. Exposed Plastic Paneling Color: Manufacturer standard white.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 PREPARATION

A. Prepare substrate by sanding high spots and filling low spots as needed to provide flat, even surface for panel installation. Comply with paneling manufacturer substrate preparation instructions.

B. Clean substrates of substances that could impair adhesive bond, including oil, grease, dirt, and dust.

C. Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.

D. Lay out paneling before installing. Locate panel joints to provide equal panels at ends of walls not less than half the width of full panels so that trimmed panels at corners are not less than 12 inches wide.

1. Mark plumb lines on substrate at trim accessory and panel joint locations for accurate installation.
2. Locate trim accessories and panel joints to allow clearance at panel edges according to manufacturer's written instructions.

E. FRP shall be installed over plywood or other rigid backer board. Refer to Section 09 2116 - Gypsum Board Assemblies.

3.03 INSTALLATION

A. Install plastic paneling according to manufacturer's written instructions. Where conflict is found between specified requirements and manufacturer requirements, the more stringent requirement shall apply.

B. Maintain plumb vertical edges with plumb lines or level.

C. Maintain uniform space between panels and wall fixtures.

D. Maintain uniform space between adjacent panels and between panels and floors, ceilings, and fixtures.

E. Provide expansion space between panels and at trim in accordance with panel manufacturer instructions.

F. Install panels in a full spread of adhesive over unfinished, untreated plywood or unfinished, untreated drywall. Refer to Section 09 2116 - Gypsum Board Assemblies.

G. Trim Moldings: Install at all perimeter panel edges and transitions using pin tacks or staples, and adhesive. Do not pin tack or staple through FRP panels. Trim molding shall surround all edges of every panel.

H. Sealant Applications:

1. Fill grooves in all trim accessories and moldings with sealant before installing. Bed inside corner trim in a bead of sealant.
2. All panel edges, terminations, and transitions shall be sealed with continuous sealant in accordance with panel manufacturer instructions.
3. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.

3.04 CLEANING AND PROTECTION

A. Clean panel system installation in accordance with manufacturer instructions.

B. Protect from damage from construction activities through date of Substantial Completion.

END OF SECTION

SECTION 09 8430

FABRIC WRAPPED ACOUSTICAL PANELS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Fabric wrapped acoustical panels.

1.03 REFERENCES

A. Definitions:

1. NRC: Noise Reduction Coefficient.
2. SAA: Sound Absorption Average.

B. Reference Standards:

1. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
3. ASTM E795 - Standard Practices for Mounting Test Specimens During Sound Absorption Tests.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation to discuss conformance with project requirements, manufacturer installation requirements, affected adjacent materials and system, and site conditions.

B. Attendees shall include contractor, fabric wrapped panel installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Manufacturer's product data sheets for products specified.

C. Shop Drawings: For unit assembly and installation.

1. Include plans, elevations, sections, and mounting devices and details.
2. Include details at panel head, base, joints, and corners; and details at ceiling, floor, and wall intersections. Indicate panel edge profile and core materials.
3. Include details at cutouts and penetrations for other work.
4. Include direction of fabric weave and pattern matching.
5. Indicate compliance with applicable codes including siesmic load requirements.

D. Coordination Drawings: Elevations and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
1. Adjacent items including, but not limited to electrical outlets, switches, and thermostats; as applicable.
2. Items penetrating or covered by units including the following, ,as applicable:
a. Lighting fixtures.
b. Air outlets and inlets.
c. Speakers.
d. Alarms.
e. Sprinklers.
f. Access panels.

E. Test Reports: Certified test data from an independent test agency verifying that panels meet specified requirements for acoustical and fire performance.

F. Manufacturer's Qualification Statement.

1.06 CLOSOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements.

C. Maintenance Data: For each type of unit to include in maintenance manuals. Include fabric manufacturers' written cleaning and stain-removal instructions.

D. Maintenance Materials: Furnish the following for Owner's use.
1. Extra Panels: One of each type.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company with not less than five years of experience in manufacturing acoustical products similar to those specified.

B. Source Limitations: Obtain units specified in this Section from single source from single manufacturer.

C. Fire-Test-Response Characteristics: Units shall comply with "Surface-Burning Characteristics" or "Fire Growth Contribution" Subparagraph below, or both, as determined by testing identical products by UL or another testing and inspecting agency acceptable to code officials:

1. Surface-Burning Characteristics: Comply with ASTM E84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

a. Flame-Spread Index: 25 or less.

b. Smoke-Developed Index: 450 or less.

2. Fire Growth Contribution: Comply with acceptance criteria of local code and code officials when tested according to NFPA 265 Method B Protocol or NFPA 286.

D. Units shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

E. Mounting shall meet applicable code requirements for siesmic resistance.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.

B. Deliver materials and units in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.

C. Protect units from moisture during shipment, storage, and handling. Deliver in factory-wrapped bundles; do not open bundles until units are needed for installation.

D. Protect edges from damage.

1.09 MOCKUPS

A. Mockup: Provide a mockup for evaluation of installation, finishes, and workmanship.

1. Locate as directed by Architect.

2. Size: Minimum one fabricated unit of each type in configuration directed by Architect.

B. Do not proceed with installation beyond mockup until the mockup installation is approved by Architect. Correct deficiencies and refinish mock-up area as required to produce acceptable work.

C. Subject to compliance with requirements, approved mockups may become part of the completed Work if accepted to remain by Architect and if undisturbed at time of Substantial Completion. Remove mockup when directed by Architect.

D. Approval of mockups does not constitute approval of deviations from the Contract Documents unless Architect specifically approves such deviations in writing.

1.10 FIELD CONDITIONS

A. Environmental Limitations: Do not install units until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work at and above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.11 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this section.
   1. Warranty Period: One year from date of Substantial Completion.

B. Special Manufacturer Warranty: Manufacturer agrees to repair or replace units and components that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to the following:
      a. Acoustical performance.
      b. Fabric sagging, distorting, or releasing from panel edge.
      c. Warping of core.
   2. Warranty Period: 2 years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Units shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Fire-Test-Response Characteristics: Units shall comply with "Surface-Burning Characteristics" or "Fire Growth Contribution" Subparagraph below, or both, as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
   1. Surface-Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
      a. Flame-Spread Index: 25 or less.
      b. Smoke-Developed Index: 50 or less.
   2. Fire Growth Contribution: Comply with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 265 Method B Protocol or NFPA 286.

2.02 FABRIC WRAPPED SOUND ABSORBING WALL PANEL UNITS

A. General: Provide pre-finished, factory assembled, fabric covered panels.

B. Product Selections: Products by Conwed. www.conwed.com

1. Drawing Designation: AWP-1.

a. Selection as indicated on Drawings.

2. Performance and Technical Requirements: As indicated by basis of design product selections on Drawings.

C. Accessories: Provide accessories as required for an installed assembly.

1. Fabric treatment: Soil and stain fabric treatment, type as recommended by fabric manufacturer.

2. Mounting Accessories: Manufacturer provided mounting accessories for substrates indicated on Drawings. Comply with applicable codes and project siesmic resistance requirements.

3. Mounting Splines: Manufacturer's standard concealed metal splines that engage the kerfed edges of the unit, with other moldings and trim for interior corners, exterior corners, and exposed edges, with factory-applied finish on exposed items.

4. Manufacturer's standard two-part metal "Z" clips, with one part of each clip mechanically attached to back of unit and the other part to substrate, designed to permit unit removal.

5. Adhesives as recommended by manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine fabricated units, areas, and conditions for compliance with requirements, installation tolerances, and other conditions affecting unit performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 INSTALLATION

A. Install units in locations as indicated, following manufacturer's installation instructions.

1. Unless otherwise indicated, install units with vertical surfaces and edges plumb, top edges level and in alignment with other units, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.

2. Comply with manufacturer's written instructions for installation of units using type of mounting devices indicated. Mount units securely to supporting substrate.

3. Align and level fabric pattern and grain among adjacent units.

B. Install units to construction tolerances of plus or minus 1/16 inch (1.6 mm) for the following:
   1. Plumb and level.
   2. Flatness.
   3. Width of joints.

3.03 CLEANING AND ADJUSTMENT

A. Clean panels facing upon completion of installation from dust and other foreign materials. Comply with manufacturer recommendations.

B. Adjust fabric which is not uniformly tight, or straight. Comply with manufacturer recommendations.

3.04 PROTECTION

A. Provide protection of installed units to prevent damage, staining, and dust accumulation until date of Substantial Completion. Comply with manufacturer recommendations.

B. Replace units that cannot be cleaned and repaired to satisfaction of the Architect.

END OF SECTION

SECTION 09 9000

PAINTING AND COATING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Field painting and coating.

B. Scope: Finish surfaces exposed to view, unless fully factory-finished and unless otherwise indicated. Includes items indicated as field painted, field finished, and shop-primed.

1. Mechanical and Electrical:
    a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
    b. In finished areas, paint shop-primed items.
    c. Paint interior surfaces of air ducts that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
    d. Paint dampers exposed behind louvers, grilles, to match face panels.
2. Do Not Paint or Finish the Following Items:
    a. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
    b. Items indicated to receive other finishes.
    c. Items indicated to remain unfinished.
    d. Rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
    e. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, and lead items.
    f. Floors, unless specifically indicated.
    g. Ceramic and other tiles.
    h. Brick.
    i. Glass.
    j. Concealed pipes, ducts, and conduits.

1.03 REFERENCES

A. Definitions:

1. Comply with ASTM D16 for interpretation of terms used in this Section
2. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D523.
3. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.
4. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.
5. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D523.
6. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D523.
7. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D523.
8. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D523.

B. Reference Standards:

1. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency.
2. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.
3. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating.
4. ASTM D4259 - Standard Practice for Abrading Concrete.
5. ASTM D4260 - Standard Practice for Liquid and Gelled Acid Etching of Concrete.
6. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials.
7. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association.
8. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual.
9. SCAQMD 1113 - Architectural Coatings.
10. SSPC V1 (PM1) - Good Painting Practice: Painting Manual, Volume 1.
11. SSPC V2 (PM2) - Systems and Specifications: Steel Structures Painting Manual, Volume 2.
12. SSPC-SP 1 - Solvent Cleaning.
13. SSPC-SP 2 - Hand Tool Cleaning.
14. SSPC-SP 3 - Power Tool Cleaning.
15. SSPC-SP 6 - Commercial Blast Cleaning.
16. SSPC-SP 13 - Surface Preparation of Concrete.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

B. Attendees shall include contractor, paint and coating systems installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Coordination Data:

1. Provide written evidence of compatibility of new paints and coatings with all substrates found on project. Evidence shall include letter from specified paint manufacturer indicating compatibility.

a. Where conflict exists between specified primers, paints, and coatings indicate conflict and manufacturer recommended substitute products.

b. Provide name, office phone, mobile phone, and email address of manufacturer technical representative assigned to the project.

C. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.

2. Indicate VOC content.

D. Samples for Initial Selection: For each type of topcoat product. Manufacturer color charts are acceptable for initial selection.

E. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches square.

2. Apply coats on Samples in steps to show each coat required for system.

3. Label each coat of each Sample.

4. Label each Sample for location and application area.

F. Certification: By manufacturer that paints and finishes comply with VOC limits specified.

G. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.06 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements.

C. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 6000 - Product Requirements, for additional provisions.
2. Furnish extra materials from the same product run that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
3. Paint: Two gallons of each paint used.
4. Label each container with color, including codes and formulas required for exact reproduction of paint, in addition to the manufacturer's standard label.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum ten years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum five years experience and approved by manufacturer.

1.08 MOCKUPS

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
   a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
   b. Other Items: Architect will designate items or areas required.
2. Final approval of color selections will be based on mock-ups.
   a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

B. Subject to compliance with requirements, approved mockups may become part of the completed Work if accepted to remain by Architect and if undisturbed at time of Substantial Completion.

C. Approval of mockups does not constitute approval of deviations from the Contract Documents unless Architect specifically approves such deviations in writing.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

D. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

E. Maintain containers in clean condition, free of foreign materials and residue.

F. Remove rags and waste from storage areas daily.

1.10 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply materials when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F (3 degrees C) above the dew point; or to damp or wet surfaces.

D. Minimum Application Temperatures for Paints: 50 degrees F (10 degrees C) for interiors unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

F. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

1.11 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this Section.

1. Warranty Period: One year from date of Substantial Completion.

B. Special Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, where items fail to perform as designed and manufactured.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. General: Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

1. Drawing Designation: P-1.
2. Drawing Designation: P-2.
3. Drawing Designation: P-3.
4. Drawing Designation: P-4.
5. Drawing Designation: P-5.
6. Other designations indicated on Drawings.

B. Paint Manufacturers:

1. Basis of Design Paints: As indicated in Part 3 Schedules.
2. Acceptable Manufacturers: Products of the following manufacturers are acceptable for use, subject to product compliance with requirements.
   a. Benjamin Moore Co. www.benjaminmoore.com
   b. PPG Paints. www.ppgpaints.com.
   c. Sherwin-Williams Company. www.sherwin-williams.com.
3. Basis of Design Compliance: Where products other than those of the manufacturer listed as the standard of quality are specified in Painting Schedule, such products have been selected to achieve specific results and substitutions will be permitted only in accordance with Product Substitution Procedures section.

C. Primer Sealers: Same manufacturer as top coats.

2.02 PAINT SHEENS AND COLORS

A. Sheens: As indicated on Drawings. Where not indicated, as selected by Architect from manufacturer full range.

B. Colors: As indicated on Drawings. Where not indicated, as selected by Architect from manufacturer full range.

2.03 NUMBER OF PAINT COATS AND COLORS

A. All Substrates: Paint application shall consist of minimum one coat of primer plus minimum two finish coats. Provide additional coats as required for full coverage and full hide paint application.

B. Door and Window Frames: Provide minimum one coat of primer plus minimum three finish coats. Provide additional coats as required for full coverage and full hide paint application..

C. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to Owner.

D. Extend colors to surface edges, unless indicated otherwise on Drawings; colors may change at any edge as directed by Architect.

2.04 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.

1. Where MPI paint numbers are specified, provide products listed in Master Painters Institute Approved Product List, current edition available at www.paintinfo.com, for specified MPI categories, except as otherwise indicated.
2. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
3. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
4. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
5. Supply each paint material in quantity required to complete entire project's work from a single production run.
6. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
7. Number of coats specified are minimum.

B. Volatile Organic Compound (VOC) Content:

1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
   a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
   b. Architectural coatings VOC limits of the State of Louisiana and complying with Owner standards. Where conflict is present, the more stringent requirement shall apply.

C. Flammability: Comply with applicable code for surface burning characteristics.

2.05 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Accessory Materials: Provide cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

C. Patching Material: Latex filler.

D. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work in accordance with manufacturer recommendations.

B. Test shop-applied primer for compatibility with subsequent cover materials.

C. Measure moisture content of surfaces using an electronic moisture meter. Comply with material manufacturer requirements Do not apply finishes unless moisture content of surfaces are below the following maximums:

1. Gypsum Wallboard: 12 percent.
2. Masonry, Concrete, and Concrete Masonry Units: 12 percent.
3. Wood: 15 percent, measured in accordance with ASTM D4442.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Apply paint only when moisture content of surfaces is within limits recommended in product data. Apply paint materials using clean brushes, rollers or spraying equipment.

F. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.03 APPLICATION, GENERAL

A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

1. Where conflict between instructions and the requirements of this section exist, coordinate with paint manufacturer to ensure the most stringent and product compatible requirement is utilized.

2. Use applicators and techniques suited for paint and substrate indicated.
3. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
4. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Priming:
1. Primer coats may be omitted for surfaces specified to receive factory-applied primer, if primer is compatible with finish coats. If primer coats are not compatible, substitute a bond coat as recommended by paint manufacturer for specified primer coat.
2. Where two-coat finish is specified, prime coat shall be tinted to approximate finish color.

C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.

D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

E. Apply each coat to uniform appearance in thicknesses specified by manufacturer. Number of coats indicated is minimum. Finished applications shall provide full hide coverage of all substrates.

F. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.

G. Sand metal surfaces lightly between coats to achieve required finish.

H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

I. Sand surfaces within normal visual range, including surfaces within 10'-0" of floor level.

J. Install prefinished or presurfaced items following finishing or sanding of adjacent surfaces. Replace prefinished items damaged by finishing of adjacent work.

K. Apply materials at rate not exceeding that recommended in product data for surface being painted, less ten percent for losses.

L. Comply with product data for drying time between coats.

M. Sand and dust between coats to remove defects visible from a distance of 5 feet.

N. Finish coats shall be smooth, free of brush marks, streaks, laps or pile-up of paint, skipped or missed areas.

O. Make edges of paint adjoining other materials or colors clean and sharp without overlapping.

P. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

Q. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

R. Gypsum board:

1. Ensure gypsum board has been finished to the level appropriate for wall finish, in accordance with finishing requirements of interior gypsum board specification section requirements.
    a. Refer to Section 09 2116 - Gypsum Board Assemblies.
2. Fill narrow, shallow cracks and small holes with patching compound. Allow to dry and sand smooth without raising nap of gypsum board paper.

S. Concrete Unit Masonry: Rub to remove loose mortar and debris. Fill irregularities with cement grout. Paint manufacturer masonry filler is acceptable for filling within manufacturer recommended range.

T. Metals:

1. Galvanized metals:
    a. Test for passivator or stabilizer using copper sulfate solution (20 grams of copper sulfate in one liter of water). If passivator or stabilizer is present, remove by brush blasting, sanding or chemical etching.
    b. Clean with manufacturer approved solvent to remove grease, oil and contaminants. Wipe dry with clean cloth.
2. Aluminum:
    a. Sand or scrape to remove oxides.
    b. Wash with xylol to remove grease, oil and contaminants. Wipe dry with clean cloth.
3. Ferrous metals:
    a. Wire-brush or sandpaper to remove rust and mill scale.
    b. Solvent-clean with xylol to remove grease, oil and contaminants. Wipe dry with clean cloth.
4. Ferrous and galvanized metals and aluminum to receive epoxy finish:
    a. Ferrous metals: Brush sandblast, power tool clean, or hand tool clean to remove rust and mill scale.
    b. Ferrous and galvanized metals and aluminum:
        1) Remove dirt and dust with stiff bristle brush or compressed air.

2) Solvent clean with xylol or mineral spirits to remove grease, oil and contaminants. Wipe dry with clean cloth.

3.04 APPLICATION, SPECIFIC ITEMS

A. Gypsum Board:

1. Where portion of finish on gypsum board partition is damaged or unacceptable, refinish entire surface of partition.

B. Doors: For doors indicated for opaque painted finishing.

1. Seal tops and bottoms of interior doors with either prime coat only or full paint system; side edges same as faces.
2. Finish top, bottom, and side edges of exterior doors same as faces.

C. HVAC Components, Piping, Ductwork:

1. Paint inside of ductwork flat black for entire area visible through ceiling openings. Paint underside of ductwork and other above-ceiling items flat black for entire area visible through ceiling openings.
2. Paint exposed piping and ductwork in painted spaces same as adjacent wall surfaces.
3. Paint exposed grilles and registers in public spaces.

D. Exposed Structure:

1. Unless otherwise indicated, paint exposed structural system.

E. Roof Areas:

1. Paint factory primed but non-prefinished construction on roof top. Coordinate painting requirements for items such as prefinished mechanical, electrical, and plumbing equipment.

F. Miscellaneous:

1. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
2. Paint factory primed ground mounted mechanical, plumbing and electrical equipment. Coordinate painting requirements for items such as prefinished mechanical, electrical, and plumbing equipment.

3.05 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to provide field testing, inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply

additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.06 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

B. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

C. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.07 PROTECTION

A. Protect finishes until completion of project.

B. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

C. Touch-up damaged finishes after date of Substantial Completion.

3.08 SCHEDULE - PAINT SYSTEMS - EXTERIOR EXPOSED STEEL - GENERAL

A. Coordination Requirements: Test all substrates for compatibility with specified paints prior to installation. Paint manufacturer representative to be present for testing.

B. Shop priming: Shop-primed ferrous structural metal in accord with Structural Steel Framing section.

C. Field Painting, General:

1. Surface preparation: Surfaces shall be clean, dry and free from dust, dirt, loose paint or primer, oil, grease, wax, rust, loose mill scale, chalk and any other contamination.
    a. Grind welds smooth.
    b. Prepare the surface per method SSPC-SP3 Power Tool Cleaning.
    c. Any existing loose or marginally adhering primer or paint, and any loose rust shall be removed by this method. Any rusty or bare metal must be spot primed prior to the application of a full coat of mastic epoxy primer.
    d. Comply with all additional surface preparation guidelines on technical data sheets and all safety guidelines in MSDS.
2. Refer to basis of design primer and paint products for additional product selections.

3.09 SCHEDULE - PAINT SYSTEMS - EXTERIOR - SHERWIN WILLIAMS BASIS OF DESIGN

A. Coordination Requirements: Test all substrates for compatibility with specified paints prior to installation. Paint manufacturer representative to be present for testing.

B. Exterior Vertical Concrete: Includes the following as applicable; Tilt-up Concrete Panels, Precast Concrete, or Cast In Place Concrete - Textured System: 10 year warranty.

1. Primer: SW Loxon Concrete and Masonry Primer.
2. First Coat: SW Loxon XP, 16.0-18.0 mils wet film thickness.
3. Texture: SW Conflex Ultracrete Acrylic Texture.
    a. Provide fine, medium, or extra coarse texture as selected by Architect.
4. Finish Coat: SW Emerald Rain Refresh Exterior Acrylic Satin.

C. Exterior CMU, Textured System: 10 year warranty.

1. Primer: SW Loxon Block Surfacer.
2. First Coat: SW Loxon XP, 16.0-18.0 mils wet film thickness.
3. Second Coat - Texture: SW Conflex Ultracrete Acrylic Texture.
    a. Provide fine, medium, or extra coarse texture as selected by Architect.
4. Finish Coat: SW Emerald Rain Refresh Exterior Acrylic Satin.

D. Exterior Ferrous Metals:

1. First coat: SW Kem Kromik Universal Metal Primer.
2. Second coat: SW DTM Acrylic coating.
3. Third coat: SW DTM Acrylic Coating.

E. Exterior Non-Ferrous Metal, Aluminum:

1. First coat: SW DTM Acrylic Primer/Finish.
2. Second coat: SW DTM Acrylic Coating.
3. Third coat: SW DTM Acrylic Coating.

3.10 SCHEDULE - PAINT SYSTEMS – INTERIOR - SHERWIN WILLIAMS BASIS OF DESIGN

A. Coordination Requirements:

1. Test all substrates for compatibility with specified paints prior to installation. Paint manufacturer representative to be present for testing.

B. Interior Wood, Painted Finish, Latex:

1. First coat: SW PrepRite ProBlock Int/Ext Primer/Sealer.
2. Second coat: SW ProMar 200 Zero VOC Interior Latex.
3. Third coat: SW ProMar 200 Zero VOC Interior Latex.

C. Interior Wood at Fire Retardant Equipment Panel Painted Finish, Latex Enamel:

1. Coordinate painting over factory fire rating labels with requirements of applicable codes for project.
2. Color: Manufacturer standard gray, selected by Architect.
3. Extents: Paint all sides, including edges.
4. First coat: Flame Control 20-20 System, distributed by Sherwin-Williams.
5. Second coat Flame Control 20-20 System, distributed by Sherwin-Williams.
6. Third coat: Flame Control 20-20 System, distributed by Sherwin-Williams.
7. Label: Provide permanent painted fire rated label indicating fire rated plywood and paint.

D. Interior Gypsum Board, Latex:
1. First coat: SW ProMar 200 Zero VOC Interior Latex Primer.
2. Second coat: SW ProMar 200 Zero VOC Interior Latex.
3. Third coat: SW ProMar 200 Zero VOC Interior Latex.

E. Interior Gypsum Board at Wet or High Abuse Areas, Waterborne Epoxy:
1. First coat: SW ProMar 200 Zero VOC Interior Latex Primer.
2. Second coat: SW Pro Industrial Waterbased Catalyzed Epoxy.
3. Third coat: SW Pro Industrial Waterbased Catalyzed Epoxy.

F. Interior Ferrous and Galvanized Metals and Aluminum at Wet or High Abuse Areas, Waterborne Epoxy:
1. First coat: SW Kem Kromik Primer.
2. Second coat: SW Pro Industrial Waterbased Catalyzed Epoxy.
3. Third coat: SW Pro Industrial Waterbased Catalyzed Epoxy.

G. Interior Ferrous and Galvanized Metals and Aluminum, Latex:
1. First coat: SW Kem Kromik Primer.
   a. Primer for Aluminum and Galvanized: SW Pro Industrial Pro-Cryl Universal Metal Primer.
2. Second coat: SW ProMar 200 Zero VOC Interior Latex.
3. Third coat: SW ProMar 200 Zero VOC Interior Latex.

H. Interior Dry Fog Coating for Interior Exposed Structural System: Includes steel joists, beams and metal decking as well as structural concrete decks; number of coats specified are minimum:
1. First coat:
   a. Ferrous metals: SW Pro Industrial Pro-Cryl Universal Metal Primer. Provide SW Kem Kromik primer or SW Opti-Bond Multi Surface Coating, where recommended by paint manufacturer for specific project substrate.
   b. Galvanized metals and aluminum: No primer required.

c. Concrete: SW Loxon Concrete and Masonry Primary or SW Loxon Conditioner.

2. Second coat: SW Pro Industrial Waterborne Acrylic Dryfall Flat.

3. Third coat: SW Pro Industrial Waterborne Acrylic Dryfall Flat.

END OF SECTION

SECTION 09 9673

CONCRETE FLOOR DENSIFYING SEALERS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Surface applied concrete densifier floor sealer finishes.

B. For use at back of house/service spaces where no other flooring finish is indicated. Includes, but is not limited to, mechanical rooms, electrical rooms, IT/networking/data rooms, custodial spaces, etc.

C. For use at other locations indicated for sealed concrete flooring finish.

1.03 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.

C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials.

D. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.

E. SCAQMD 1113 - Architectural Coatings.

F. ICRI Technical Guidelines: Series 300 - Concrete, Designation 310 - Surface Preparation.

G. ASTM C 171 - Standard Specification for Sheet Materials for Curing Concrete.

H. ASTM C 309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation to discuss conformance with project requirements, manufacturer installation requirements, affected adjacent materials and system, and site conditions.

1. Review substrates, preparation, and manufacturer recommendations for installation.

B. Attendees shall include contractor, densifier installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Provide complete list of products to be used including manufacturer standard product data sheets for each.

1. Use same designations indicated on Drawings and in schedules. Include color designations.

C. Certification: Written statement or test report from manufacturer that densifier finishes comply with VOC limits specified.

D. Applicator's Qualification Statement.

1.06 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements.

C. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. Extra Finish Materials: 1 gallon (4 L) of each type; from the same product run, store where directed.

2. Label each container with type in addition to the manufacturer's label.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 10 years of documented experience producing the specified products.

B. Installer Qualifications: Minimum 5 years of documented experience with work of similar scope and complexity required by this Project and acceptable to, or certified by, concrete densifier manufacturer.

C. Regulatory Requirements:

1. Code of Federal Regulations 40 CFR 59, Subpart D and EPA Test Method 24 establish VOC emissions standards and test protocols for architectural coatings.

2. Products to comply with United States Clean Air Act for maximum Volatile Organic compound (VOC) content as specified in this Section.

D. Material Source Limitations: Obtain each specified material from the same source.

1.08 MOCKUPS

A. Mockup: Provide a mockup for evaluation of installation, finishes, and workmanship.

1. Locate as directed by Architect.
2. Size: Minimum 100 square feet in configuration directed by Architect.
3. Construct mockup using materials, processes, and techniques required for the work, including curing procedures. Incorporate representative control, construction, and expansion joints according to Project requirements. Installer for the work to construct mockup.
4. Mockup to be by the Installer who will actually perform the work for the Project. Record the amount of densifier needed per square foot of application to establish coverage rates for the work.

B. Do not proceed with installation beyond mockup until the mockup installation is approved by Architect. Correct deficiencies and refinish mock-up area as required to produce acceptable work.

C. Subject to compliance with requirements, approved mockups may become part of the completed Work if accepted to remain by Architect and if undisturbed at time of Substantial Completion. Remove mockup when directed by Architect.

D. Approval of mockups does not constitute approval of deviations from the Contract Documents unless Architect specifically approves such deviations in writing.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in original factory unopened, undamaged packaging bearing identification of product, manufacturer, batch number, and expiration date as applicable.

B. Store products in a location protected from damage, construction activity, and adverse environmental conditions, and away from combustible materials and sources of heat, according to manufacturer’s printed instructions and current recommendations.

C. Handle products according to manufacturer’s printed instructions.

1.10 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by manufacturer of finishes.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Maintain an ambient temperature between 50 deg F and 90 deg F during application and at least 48 hours after application. Do not proceed with exterior applications during rainy, foggy, or very humid weather.

D. Minimum Application Temperature: 50 degrees F (10 degrees C) unless required otherwise by manufacturer's instructions.

1.11 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this section.

1. Warranty Period: One year from date of Substantial Completion.

B. Special Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, where items fail to perform as designed and manufactured.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide materials used in any individual system from the same manufacturer; no exceptions.

B. Basis of Design: Sikafloor-957 SSD by Sika USA. www.us.sika.com

1. Drawing Designation: SC-1.

C. Acceptable Manufacturers and Products: Subject to compliance with requirements.

1. Ashford Formula by Curecrete Distribution. www.ashfordformula.com
2. Euco Diamond Hard by Euclid Chemical. www.euclidchemical.com
3. Laticrete International, Inc., L & M Construction Chemicals, Inc., L&M Seal Hard; www.laticrete.com
4. Sikafloor-957 SSD by Sika USA. www.us.sika.com

D. Characteristics:

1. Concrete densifier, fluid applied.
2. For interior or exterior use.
3. Colorless.
4. Odorless.
5. Non-toxic.
6. Non-combustible.
7. Non-flammable.
8. Contains NO Volatile Organic Compounds (VOCs).
9. Seals, dust proofs, hardens, and cures.

10. Protects against dusting, pitting, palling, efflorescence, temperature cracking in concrete.
11. Inhibits freeze/thaw deterioration.
12. Neutralizes excess internal alkali from concrete.
13. Applications: For use on interior or exterior concrete floors.

E. Color and Sheen:
1. Sheen: Matte.
2. Color: Colorless.

2.02 ACCESSORY MATERIALS

A. Accessory Materials: Provide cleaning agents, cleaning cloths, sanding/grinding/prep materials, and clean-up materials as required for completion of finished surfaces. Use materials recommended by finish manufacturer.

B. Temporary Floor Protection: SCOFIELD Proguard Duracover, manufactured by Sika Corporation.

C. Temporary Floor Protection Seam Tape: SCOFIELD Proguard Heavy Duty Seaming Tape, manufactured by Sika Corporation.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are within manufacturer recommended range.

E. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this section indicates acceptance of substrates and conditions.

3.02 PREPARATION

A. New Concrete: Comply with the following:
1. Newly placed concrete to sufficiently cure for concrete to become reactive. Minimum cure time is 28 days.

2. Do not use liquid curing materials. Cure concrete flatwork with new, unwrinkled, non-staining, high quality curing paper complying with ASTM C 171. Do not overlap curing paper.

B. Completed preparation to result in concrete surfaces that are uniformly slip-resistant and profiled to meet a Concrete Surface Preparation (CSP) of 1-2 according to referenced ICRI guidelines.

3.03 APPLICATION

A. Installation shall be in accordance with manufacturer instructions.

B. Protect surrounding areas, landscaping, and adjacent surfaces from overspray, runoff, and tracking. Divide surfaces into small work sections using walls, joint lines, or other stationary breaks as natural stopping points.

3.04 PROTECTION

A. Protect finishes until date of Substantial Completion.

B. All concrete substrates that will be not be covered by other materials will be protected throughout the project. The concrete slab must be treated as a finished floor at all times during construction.

C. Temporary Floor Protection will be removed only while finish work to the concrete is being performed and will be replaced after the final finish has cured sufficiently.

D. Install temporary floor finish protection and floor protection seaming tape in accordance with manufacturer's published installation procedures.

3.05 CLEANING

A. After completing finish application, clean spattered surfaces. Remove spattered materials by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

B. Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

3.06 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

SECTION 10 1400

SIGNAGE

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Interior and exterior signage.

1.03 REFERENCE STANDARDS

A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines.

B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design.

C. ICC A117.1 - Accessible and Usable Buildings and Facilities.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation to discuss conformance with project requirements, manufacturer installation requirements, affected adjacent materials and system, and site conditions.

B. Attendees shall include contractor, signage installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 COORDINATION REQUIREMENTS

A. Interior Signage: Coordinate mounting, mounting height, fastening, and securement data. Coordinate special requirements for substrate finishes and types signage is to be installed over.

B. Exterior Signage: Coordinate mounting, mounting height, fastening, and securement data. Coordinate special requirements for substrates that signage is to be installed over.

1. Coordinate with installer and manufacturer of exterior cladding system that installation of signage will not void any warranties or impede proper function of the wall system and that penetration is included in the system warranty, where applicable.

1.06 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Manufacturer's printed product literature for each type of sign, sign materials, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.

C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.

1. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.

2. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.

3. Submit for approval by Owner through Architect prior to fabrication.

D. Shop Drawings: Provide installation drawings and details indicating sign sizes, materials, thicknesses, dimensions, textures, and other characteristics.

1. Interior Signage: Provide mounting, mounting height, fastening, and securement data. Indicate special requirements for substrate finishes and types signage is to be installed over.

2. Exterior Signage: Provide mounting, mounting height, fastening, and securement data. Indicate special requirements for substrates that signage is to be installed over.

3. Exterior Cladding Systems:

a. Provide details and instructions for penetrating exterior cladding systems. Provide for each layer of the exterior wall assembly.

b. Provide written statement from installer and manufacturer of exterior cladding system that installation of signage will not void warranties or impede proper function of the wall system and that penetration is included in the system warranty.

1.07 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Maintenance Data: Provide manufacturer parts lists, and maintenance instructions for the materials of this Section.

1.08 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Package signs as required to prevent damage before installation.

1.10 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this section.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, where items fail to perform as designed and manufactured.

1. Warranty Period: Provide manufacturer standard warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. General: Refer to Owner signage requirements for interior and exterior signage.

1. Basis of Design: Signage by Takeform Signs. www.takeform.net
2. Provide identification and way finding signage complying with requirements of Accessibility and Life Safety Codes.

B. Acceptable Manufacturers: Subject to compliance with requirements. Coordinate with Owner signage requirements. Refer to project Drawings for additional requirements.

1. ASI Signage Systems. www.asisignage.com
2. FASTSIGNS. www.fastsigns.com
3. Takeform Signs. www.takeform.net

2.02 ACCESSORIES

A. General: Provide accessories as recommended by signage manufacturer for a complete installation.

B. Fasteners and Anchors: Stainless steel.

C. Tape Adhesive for Interior Locations: Double sided tape, permanent adhesive designed for permanent interior applications.

D. Bituminous Paint/Coating: Refer to Section 07 1115 - Protective Bituminous Paint Coating.

1. Coordinate with requirements of product/material manufacturer(s) of this Section and of adjacent products/materials.
2. For use as corrosion protection between dissimilar materials.

3. Apply in two coats for full coverage minimum 30 dry mil thickness, unless indicated otherwise.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this section indicates acceptance of substrates and conditions.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install plumb and true with level edges.

C. Protect from damage until Substantial Completion; repair or replace damaged items.

END OF SECTION

SECTION 10 2113

SOLID PLASTIC HDPE TOILET COMPARTMENTS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Toilet compartments.

B. Urinal screens.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate the work with placement of support framing and anchors in walls, ceilings.

B. Preinstallation Conference: Conduct conference at Project site minimum 14 days prior to installation.

1. Attendees shall include contractor, partition installer and installers of adjacent materials and systems.
2. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.04 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Manufacturer's data sheets on each product to be used.

C. Shop Drawings:

1. Dimensioned plans indicating layout of items.
2. Dimensioned elevations indicating heights of doors, pilasters, separation partitions, and other components; indicate locations and sizes of openings in compartment separation partitions for toilet and bath accessories to be installed in partitions; indicate floor and ceiling clearances.
3. Details indicating anchoring components (bolt layouts) and methods for project conditions; indicate components required for installation, but not supplied by toilet compartment manufacturer.

D. Selection Samples: For each finish product specified, one complete set of color selection charts representing manufacturer's full range of available colors, textures and patterns.

E. Verification Samples: For each finish product specified, two samples representing actual product, color, texture and pattern. Provide when requested by Architect.

1.05 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Manufacturer Warranty: Executed warranty meeting specified requirements.

C. Maintenance Data: To include in maintenance manuals.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle materials and products in strict compliance with manufacturer's instructions and recommendations and industry standards.

B. Store products indoors in manufacturer's or fabricator's original containers and packaging, with labels clearly identifying product name and manufacturer. Protect from damage.

C. Lay cartons flat, with adequate support to ensure flatness and to prevent damage to pre-finished surfaces.

D. Do not store where ambient temperature exceeds 120 degrees F (49 degrees C).

1.07 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

B. Do not deliver materials or begin installation until building is enclosed, with complete protection from outside weather, and building temperature maintained at a minimum of 60 degrees F (15.6 degrees C).

C. Coordinate Work with placement of support framing and anchors in walls and ceilings.

1.08 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this section.

1. Warranty Period: One year from date of Substantial Completion.

B. Special Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, where items fail to perform as designed and manufactured.

1. Provide warranty for Solid polymer HDPE material against breakage, corrosion, and delamination.

a. Warranty Period: Twenty-five years from date of Substantial Completion.

2. Warranty against against defects in material and workmanship for stainless steel door hardware and mounting brackets.

a. Warranty Period: Provide manufacturer standard warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: Products by Hiny Hiders Toilet Partitions as manufactured and supplied by Scranton Products. www.scrantonproducts.com
   1. Drawing Designation: TP-1.
   2. Selection: As indicated on Drawings.

B. Acceptable Manufacturers and Products: Subject to compliance with requirements.
   1. ASI Global Partitions, an ASI Group Company. www.asi-globalpartitions.com
   2. Bradley Corporation (Mills), a Watts brand. www.bradleycorp.com
   3. Scranton Products. www.scrantonproducts.com
   4. General Partitions Mfg. Corp. www.generalpartitions.com
   5. Hiny Hiders Toilet Partitions as manufactured and supplied by Scranton Products/Comtec, a division of the Azek Company. www.scrantonproducts.com
   6. Metpar Corporation. www.metpar.com

2.02 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Flame-Spread Index: 25 or less.
   2. Smoke-Developed Index: 450 or less.
   3. Rating: Class "B" Fire Rated per ASTM E84.

B. Material shall be compliant with applicable project does and must be solid HDPE; foamed material is not allowed. Material shall be NFPA 286 compliant.

2.03 COMPARTMENTS AND SCREENS

A. Toilet Compartments: Floor anchored/overhead braced solid polymer.
   1. Compartment Depth and Width: As indicated on Drawings.
   2. Door Width: 24 inches, minimum; at ADA accessible compartments 36 inches minimum.
   3. Height Above Floor: 14 inches.
   4. Door/Panel Height: 55 inches.
   5. Pilaster Height: 82 inches.

B. Privacy and Urinal Screens: Wall hung.
   1. Screen Panel Size: 24 inches (610 mm) wide by 48 inches high.

2.04 SOLID POLYMER TOILET COMPARTMENTS

A. Doors, Panels, Screens, and Pilasters: Single sheet solid, homogenous HDPE plastic material formed from waterproof, non-absorbent, high-density polyethylene resins; mark- resistant self-lubricating surface; edges finished smooth.

1. Material: Solid, homogenous HDPE; 1 inch (25 mm) thick.
2. Rating: Class "B" Fire Rated per ASTM E84.
3. Material shall be compliant with IBC 2012 or later and must be solid HDPE; foamed material is not allowed. Material shall be NFPA 286 compliant.
4. Edges: 1/4 inch radius machined edges.
5. Heat Sink: Aluminum heat sink, to dissipate heat from incendiary devices used by vandals, attached to bottom of doors and panels.

B. Door Hardware, Stainless Steel: 8 inch aluminum wrap-around hinge.

1. Heavy duty, institutional grade, tamper resistant.
2. Hinges: Hinges shall be continuous stainless steel with wrap-around flanges, surface mounted and through bolted to doors and pilasters. Hinges operate and are field set with adjustable nylon cams. Cams can be set in 30 degree increments.
3. Latch: Stainless steel, with housing, slide bolt, button and occupancy indicator.
4. Strike and Keeper: 6 inch wrap-around flanges fabricated from stainless steel.
5. Coat Hook and Bumper: Stainless steel with black rubber tip for doorstop.
6. Fastening Hardware: Manufacturer's standard, stainless steel with theft-resistant barrel nuts and machine screws.
7. Door Pulls: Stainless steel. Standard on ADA compartments. Two per ADA door.
8. Metal Type: Manufacturer's standard, Type 304 stainless steel.
9. Exposed Metal Hardware Finish: No. 4 satin finish.

C. Mounting Brackets: Provide optional aluminum continuous brackets with theft resistant barrel nuts and shoulder screws.

D. Pilaster Shoes: Type 304 Stainless Steel No. 4 satin finish. Stall shoe shall be of a one piece design and integral to the mounting system and formed from 304 stainless steel 3 inch (76 mm) high with a No. 4 satin finish. Pilaster shoes are anchored to the pilaster with No. 10 stainless steel, vandal-resistant screws.

E. Headrail: Manufacture's standard anodized aluminum rail with anti-grip profile.

F. Pilaster Anchors: Floor Anchored/Overhead Braced.

1. Stall shoe system. 1/4 by 2 inch (6 by 51 mm) steel screws attaching stall shoe to floor.
2. Pilaster to be inserted into shoe and secured after height adjusted. Leveling adjustment to be concealed by pilaster shoe.

3. Height/leveling adjustment to be made via machine thread bolts inserted into factory installed threaded insert in bottom of pilaster.

2.05 FINISHES

A. Finish Texture: As selected by Architect from manufacturer full range.

B. Finish Color: As selected by Architect from manufacturer full range.

PART 3 EXECUTION

3.01 EXAMINATION

A. Inspect and prepare substrates using the methods recommended by the manufacturer for achieving best result for the substrates under project conditions. Clean surfaces thoroughly prior to installation.

B. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.

1. Verify dimensions of areas to receive compartments.
2. Verify locations of built-in framing, anchorage, bracing, and plumbing fixtures.

C. Do not proceed with installation until substrates have been prepared using the methods recommended by the manufacturer and deviations from manufacturer's recommended tolerances are corrected.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 INSTALLATION

A. Install in accordance with approved shop drawings and manufacturer's instructions.

B. Install partitions secure, rigid, plumb, and level in accordance with manufacturer's instructions.

C. Maintain 3/8 inch to 1/2 inch (9 mm to 13 mm) space between wall and panels and between wall and end pilasters.

D. Attach panels and pilasters to brackets. Locate head rail joints at pilaster center lines.

E. Fasten components to adjacent materials and to other components using purpose-designed fastening devices.

F. Adjust pilaster anchors for substrate variations; conceal anchors with pilaster shoes.

G. Equip each compartment door with hinges and door latch.

H. Install door strike keeper on pilasters in alignment with door latch.

I. Equip each compartment door with one coat hook and bumper.

J. Installation Tolerances:

1. Maximum variations from plumb or level: 1/8 inch.
2. Clearance between wall surface and panels or pilasters: 1-1/2 inch maximum.

K. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

3.03 ADJUSTING

A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch (5 mm).

B. Adjust hardware for proper operation after installation. Set hinge cam on in-swinging doors to hold doors open when unlatched. Set hinge cam on out-swinging doors to hold unlatched doors in closed position.

C. Adjust adjacent components for consistency of line or plane.

3.04 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products.

C. Remove factory protective coverings and clean finish surfaces in accordance with manufacturer's instructions to date of Substantial Completion.

END OF SECTION

SECTION 10 2239

OPERABLE PANEL PARTITIONS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Operable panel wall partitions.

B. Related work includes, but is not limited to, the following

1. Section 05 5000 - Metal Fabrications for support framing.

1.03 DEFINITIONS

A. NVLAP: National Voluntary Laboratory Accreditation Program

B. NIC: Noise Isolation Class

C. STC: Sound Transmission Class

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

B. Attendees shall include contractor, partition installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Material descriptions, construction details, finishes, installation details, and operating instructions for each type of operable panel partition, component, and accessory specified. Included data on acoustical performance, surface-burning characteristics, and durability.

C. Shop Drawings: Show location and extent of operable panel partitions. Include plans, elevations, sections, details, attachments to other construction and accessories. Indicate dimensions; weights; conditions at openings and for storage; and required installation,

storage, and operating clearances. Indicate location and installation requirements for hardware and track, and direction of travel. Show blocking to be provided by others.

D. Setting Drawings: For embedded items and cutouts required in other work, including support beam-punching template.

E. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for units with factory-applied color finishes.

F. Product Certificates: Submit letter signed by manufacturer certifying that operable walls to be furnished on this project comply with the requirements of the specification.

G. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

1. The owner reserves the right to field sound test the operable walls located within 60 days of the date of substantial completion. Cost for field sound testing shall the responsibility of the owner.

H. Product Test Reports: From an independent testing agency indicating that each operable panel partition complies with requirements. Submit the following:

1. Report for STC.
2. Proof load testing of track/trolley/bracket/hanger rod assembly.

I. Maintenance Data: For the following to include in maintenance manuals specified in Division 1.

1. Panel finishes and finishes for exposed trim and accessories. Include precautions for materials and methods that could be detrimental to finishes and performance.
2. Seals, hardware, track, carriers, and other operating components.

1.06 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements. Warranty shall be completed in Owner's name and registered with manufacturer.

C. Maintenance Data: Provide manufacturer parts lists, operation, and maintenance instructions for the materials of this Section.

1.07 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified in writing by the operable wall manufacturer as qualified to install the manufacturer's partition system for work similar in material, design, and extent to that indicated for this project.

B. Testing Agency Qualifications: An independent NVLAP-accredited testing laboratory with experience and capability to conduct the testing indicated, as documented according to ASTM E-548.

C. Fire-Test-Response Characteristics: Provide operable wall partitions with the following fire-test-response characteristics

1. Surface-Burning Characteristics: As follows, per ASTM E-84:
2. Flame Spread: 25 or less
3. Fire Growth Contribution: Textile wall coverings comply with the acceptance criteria of UBC Standard 8-2.

1.08 MOCKUPS

A. Mockup: Provide a mockup for evaluation of installation, finishes, and workmanship.

1. Locate as directed by Architect.
2. Size: Minimum one fabricated unit in configuration directed by Architect.

B. Do not proceed with installation beyond mockup until the mockup installation is approved by Architect. Correct deficiencies and refinish mock-up area as required to produce acceptable work.

C. Subject to compliance with requirements, approved mockups may become part of the completed Work if accepted to remain by Architect and if undisturbed at time of Substantial Completion. Remove mockup when directed by Architect.

D. Approval of mockups does not constitute approval of deviations from the Contract Documents unless Architect specifically approves such deviations in writing.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in protective packaging.

B. Deliver materials in order as required by schedule for installation.

C. Handle materials in accordance with manufacturer's instructions.

1.10 PROJECT CONDITIONS

A. Field Measurements: Verify operable panel partition openings and storage arrangements by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work.

1.11 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this section.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer Warranty:

1. Track:

a. Provide 2-year all inclusive warranty covering defects in material and workmanship.

b. Covered components shall include track, trolleys, track curves, intersections, switches and control devices exclusive of wiring.

2. Panels:

a. Provide 2-year all inclusive warranty covering defects in material and workmanship.

b. Warranty shall cover structural members, panel faces, panel trim, hardware and operating components.

c. 5-Year Panel Limited Warranty: Provide 5-year limited warranty for welded steel panels. Warranty shall cover structural members, panel faces, panel trim, hardware and operating components. In the event warranty covered items fail or have their performance materially reduced due to defects in workmanship or materials, the manufacturer shall repair or provide replacement parts FOB jobsite, not including unloading or installation. Warranty shall not exclude "normal wear and tear".

3. All warranties shall commence on the date of substantial completion of the installation, when performed by manufacturer or walls' provider.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: Products by by Modernfold, Inc., a DORMA Group Co. www.modernfold.com/en-US

1. Selections: Motorized operation in configuration selected by Architect. Refer to Drawings for additional requirements.

B. Acceptable Manufacturers: Subject to compliance with specified requirements.

1. Hufcor, Inc. www.hufcor.com.

2. Kwik-Wall Co. www.kwik-wall.com

3. Modernfold, Inc., A DORMA Group Co. www.modernfold.com/en-US

2.02 ACOUSTICAL PERFORMANCE REQUIREMENTS

A. Acoustical Performance: Provide operable panel partitions tested by a qualified testing agency for the following acoustical properties according to test methods indicated.

B. Sound Transmission Requirements: Operable panel partition assembly in a full-size opening, 14 by 9 feet (4267 by 2742 mm), for laboratory sound transmission loss performance according to ASTM E90, determined by ASTM E413, and rated for not less than STC indicated.

1. Acoustical performance shall be tested at a laboratory accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) and in accordance with ASTM E90 Test Standards.
2. Complete, unaltered written test report is to be made available upon request.

C. Provide acoustical materials required for performance of walls directly adjacent to operable panel partition.

2.03 ACCESSORIES

A. Storage Pocket Door: Operable walls shall have acoustical storage pocket doors. Storage pocket doors shall conceal stacked partition and have same materials, finish, construction, thickness and acoustical qualities as panels; complete with operating hardware.
1. Refer to Drawings for storage pocket and door configuration.
2. Unless indicated otherwise, storage pocket doors shall utilize wall manufacturer's standard method for securing pocket doors in closed position.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify track supports are laterally braced and will permit track to be level within 1/4 inch of required position and parallel to the floor surface.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 INSTALLATION

A. The complete installation of the operable wall system shall be by an authorized factory-trained installer and be in strict accordance with the approved shop drawings and manufacturer’s standard printed specifications, instructions, recommendations and ASTM E557.

B. Install acoustic sealant to achieve required acoustic performance.

C. Coordinate electrical connections.

3.03 ADJUSTING

A. Adjust partition assembly to provide smooth operation from stacked to full open position. Do not over-compress acoustic seals.

B. Visually inspect partition in full extended position for light leaks to identify a potential acoustical leak.

C. Adjust partition assembly to achieve lightproof seal.

3.04 CLEANING

A. Clean finish surfaces and partition accessories.

B. All track and panel surfaces shall be wiped clean and free of handprints, grease, and soil.

3.05 CLOSEOUT ACTIVITIES

A. Repair or adjust to ensure full operation.

B. Installer shall demonstrate proper operation and maintenance procedures to owner's representative.

C. Operating devices and owners manuals shall be provided to owner's representative.

END OF SECTION

SECTION 10 2600

WALL AND DOOR PROTECTION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Corner guards.

1.03 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Indicate physical dimensions, features, and anchorage details.

C. Samples: Submit samples illustrating component design, configurations, joinery, color and finish.

1. Submit two sections of corner guards, 24 inches (610 mm) long.

D. Manufacturer's Instructions: Indicate special procedures, perimeter conditions requiring special attention.

1.04 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Maintenance Data: Provide manufacturer maintenance instructions for the materials of this Section.

C. Maintenance Materials: Furnish the following for Owner's use.

1. Minimum one complete unit of each type specified.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver wall and door protection items in original, undamaged protective packaging. Label items to designate installation locations.

B. Do not deliver products to project site until areas for storage and installation are fully enclosed, and interior temperature and humidity are in conformance with manufacturer's recommendations for each type of item.

C. Store products in either horizontal or vertical position, in conformance with manufacturer's instructions.

1.06 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this section.
   1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, where items fail to perform as designed and manufactured.
   1. Warranty Period: Three years from date of Substantial Completion.

C. Special Manufacturer Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace materials that show evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Warranty Period: Ten years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 CORNER GUARDS

A. Basis of Design: Products by InPro Corporation www.inprocorpcom
   1. Drawing Designation: CG-1.

B. Aluminum Corner Guard:
   1. Length: 12' (3.66m).
   2. Attachment - #535 Heavy Duty Adhesive.
   3. Configuration:
      a. Width: 1-1/2inches.
      b. Angle: Typical 90 degrees.
      c. Installed Height: As indicated on Drawings.
   4. Performance Requirements: Provide corner guard systems that conform to the following requirements of regulatory agencies.
      a. Fire Performance Characteristics: Provide UL Classified corner guards conforming with NFPA Class A fire rating. Surface burning characteristics, as determined by UL-723 (ASTM E-84), shall be flame spread of 10 and smoke development of 350 - 450.
   5. Materials:
      a. Aluminum: Aluminum Corner Guards shall be manufactured from 5005-H34 and 6063-T6 aluminum
      b. Adhesive: Field applied heavy-duty adhesive.
   6. Finishes: As indicated on Drawings. Where not indicated, as selected by Architect from one of the following.

a. Aluminum corner guards shall have a clear anodized finish. Finish shall be to 204R1 specification.

b. Aluminum corner guards shall have a black anodized finish. Finish shall be Black, Class 1.

c. Aluminum corner guards shall have a light bronze anodized finish. Finish shall be Light Bronze, Class 1.

2.02 FABRICATION

A. Fabricate components with tight, flush joints, corners and seams.

B. Pre-drill holes for attachment.

C. Form end trim closure by capping and finishing smooth.

2.03 SOURCE QUALITY CONTROL

A. Provide wall and door protection systems of each type from a single source and manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that rough openings, concealed blocking, and anchors are correctly sized and located.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 INSTALLATION, GENERAL

A. Install components in accordance with manufacturer's instructions, level and plumb, secured rigidly in position to supporting construction.

3.03 CLEANING

A. Clean in accordance with manufacturer recommendations prior to date of Substantial Completion.

3.04 PROTECTION

A. Protect installed items through date of Substantial Completion.

B. Clean, repair, or replace items to as new condition to the Architect's satisfaction.

END OF SECTION

SECTION 10 2800

TOILET ACCESSORIES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Commercial toilet accessories.

B. Related Requirements:

1. Section 05 500 Metal Fabrications: Concealed supports for accessories, including in wall framing and plates, above ceiling framing, and backing plate reinforcement.

1.03 REFERENCES

A. Reference Standards:

1. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

B. Attendees shall include contractor, toilet accessory installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.

C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

1.06 WARRANTY

A. Manufacturer Warranty: Provide standard manufacturer warranty for each item, unless indicated otherwise.

1. Mirrors: Warrant mirrors for ten years against silver spoilage.
2. Hand dryers: Warrant hand dryers parts, labor and installation for three years.
3. All warranties shall begin on Date of Substantial Completion.

B. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this section.
1. Warranty Period: One year from date of Substantial Completion.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. All accessories shall be products of a single manufacturer unless indicated otherwise.

B. General Fabrication: All accessories shall be fabricated with tight, consistent tolerances to produce plumb and square finished toilet accessories.
1. Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
2. Seams shall be consistent width, joints shall fit tightly. Provide seamless, welded units where indicated by product selections.
3. Grind welded joints smooth.
4. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.
5. Exposed edges shall be hemmed, returned, or flanged; sharp edges not permitted.
6. Acceptability of fabrication work shall be by Architect.

C. Accessibility: Items shall comply with applicable accessibility requirements including ADA.

D. Keying: Keyed accessories shall be keyed alike, unless otherwise specified. For keyed accessories, provide minimum three keys to Owner.

E. Operation: Control and operating mechanisms shall be operable with one hand, without tight grasping, pinching, or twisting of wrist, and with a maximum force of 5 lbf.

2.02 TOILET ACCESSORIES

A. Basis of Design: Products by Bobrick Washroom Equipment, unless indicated otherwise. Provide as indicated on Drawings and as specified in this Section. Where not indicated, as selected by Architect.
1. Finish: Satin-finish stainless steel, unless indicated otherwise.

2.03 UNDER-LAVATORY PIPE AND SUPPLY COVERS

A. Undersink Pipe Covers:
1. Characteristics:
a. Material: Soft, resilient molded vinyl.

b. Nominal Wall: 1/8" constant with internal ribs.

c. Durometer: 70-80 - Shore A.

d. UV Protection: Will not fade or discolor.

e. Compatibility: Fits all 1-1/4" or 1-1/2" cast brass or tubular P-trap assemblies and 3/8" or 1/2" angle stop assemblies.

f. Compatibility: Fits all 1-1/2" schedule 40 plastic P-traps.

g. Paintability: Apply latex paint.

h. Burning Characteristics: Per ASTM D-635; Self extinguished 0 sec (ATB) mm (AEB).

i. Bacteria/Fungus Resistance: Per ASTM G21 and G22 — Result: 0 growth.

j. Maintenance: Cleanable with common detergents.

k. Color: Black, manufacturer standard.

2. Basis of Design: American Granby, Inc., Trap Wrap.

3. Acceptable Manufacturers and Products: Subject to compliance with requirements.

a. American Granby, Inc., Trap Wrap.

b. Truebro, Inc., Truebro Lav-Guard 2.

c. Plumberex, Handy-Shield Maxx.

2.04 CUSTODIAL AND UTILITY ROOM ACCESSORIES

A. Combination Utility Shelf/Mop/Broom Holder with Rag Hooks: 0.05 inch (1.3 mm) thick stainless steel, Type 304, with 1/2 inch (12 mm) returned edges, 0.06 inch (1.6 mm) steel wall brackets.

1. Utility shelf with mop/broom holders and rag hooks shall be type-304 stainless steel with all-welded construction; exposed surfaces shall have satin finish.

2. Mounting Base and Shelf: 18-8, type-304, 18-gauge (1.2mm) stainless steel with satin finish. All-welded construction. Shelf is 8" (205mm) deep with 3/4" (19mm) return edge on all three sides. Front edge is hemmed for safety.

3. Shelf Support Brackets: 18-8, type-304, 16-gauge (1.6mm) stainless steel with satin finish. Welded to mounting base and shelf.

4. Mop/Broom Holders: Spring-loaded rubber cams with anti-slip coating. Plated steel retainers.

5. Hooks: 18-8, type-304, 12-gauge (2.8mm) stainless steel with satin finish. Each hook attached to mounting strip with two rivets.

6. Selection: Bobrick B-239 x 34.

2.05 MATERIALS

A. Stainless Steel Sheet: ASTM A666, Type 304 or Type 316.

B. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.

C. Mirror Glass: Tempered safety glass, ASTM C1048; and ASTM C1036 Type I, Class 1, Quality Q2, with silvering as required.

D. Adhesive: Two component epoxy type, waterproof.

E. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.

F. Sealants: Pick-proof, tamper-proof; security type.

G. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify exact location of accessories for installation.

B. Verify that field measurements are as indicated on drawings.

C. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 PREPARATION

A. Deliver inserts and rough-in frames to site for timely installation.

B. Provide templates and rough-in measurements as required.

3.03 INSTALLATION

A. Install accessories in accordance with manufacturer instructions in locations indicated on drawings.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights: As indicated on drawings, and as required by accessibility regulations, unless otherwise indicated.

3.04 PROTECTION

A. Protect installed accessories from damage due to subsequent construction operations through date of Substantial Completion.

END OF SECTION

SECTION 10 4116

EMERGENCY KEY CABINETS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Emergency key storage cabinet for first responder rapid property access.

1.03 REFERENCE STANDARDS

A. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems.

B. NFPA 10 - Standard for Portable Fire Extinguishers

C. UL (DIR) - Online Certifications Directory.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation to discuss conformance with project requirements, manufacturer installation requirements, affected adjacent materials and system, and site conditions.

1. Coordinate sizes and locations of cabinets with wall depths.

B. Attendees shall include contractor, emergency key cabinet installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Provide color and finish, anchorage details, installation instructions, and operational instructions.

C. Shop Drawings: Indicate locations of cabinets and cabinet physical dimensions.

D. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.

E. Warranty: Sample of special warranty.

1.06 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements. Warranty shall be completed in Owner's name and registered with manufacturer.

C. Maintenance Data: Provide manufacturer parts lists, operation, and maintenance instructions for the materials of this Section.

1.07 FIELD CONDITIONS

A. In accordance with manufacturer instructions and recommendations.

1.08 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this section.

1. Warranty Period: One year from date of Substantial Completion.

B. Special Manufacturer Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace cabinets that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Entire cabinet assembly will remain free from defects in materials and workmanship. Defects include faulty or failed operation of locks, tumblers, pins, hinges, or electronics, to function as designed for their intended use.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: Knox Company, Inc., KnoxBox 3200 or 4400 Series.

1. Final selection shall comply with applicable codes including local fire marshall requirements.

B. Requirements:

1. Location: As indicated on Drawings. Where not indicated, as selected by Architect.

2. Style: Recessed.

a. Provide recessed mounting kit in locations recommended by manufacturer.

3. Compliant with the following standards: UL 1037, UL 1610, UL 1332, and UL 437.

4. Weather and dust resistant door gasket.

5. Continuous door hinge.

6. Tamper proof with tamper switch connected to facility security alarm. Connect to facility fire alarm panel where required by code or fire officials.

C. Finish: Manufacturer proprietary coating system.

D. Color: To be selected by Architect from manufacturer standard range.

2.02 ACCESSORIES

A. Provide accessories, electronic wiring, and securement as recommended by manufacturer for a complete, functional assembly.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify rough openings for cabinet are correctly sized and located.

C. Examine walls and partitions for suitable framing depth and blocking where recessed and semirecessed cabinets will be installed.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install cabinets plumb and level in wall openings at height required by applicable code. Coordinate with drawings.

C. Connect to building security and data systems. Coordinate with project electrical engineering specifications.

3.03 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by cabinet and mounting bracket manufacturers.

E. Replace cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

3.04 SCHEDULES

A. Coordinate locations and types with drawings and applicable codes.

END OF SECTION

SECTION 10 4400

FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Fire extinguisher cabinets.

B. Fire extinguishers.

C. Accessories.

1.03 REFERENCE STANDARDS

A. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems.

B. NFPA 10 - Standard for Portable Fire Extinguishers.

C. UL (DIR) - Online Certifications Directory; Current Edition.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation to discuss conformance with project requirements, manufacturer installation requirements, affected adjacent materials and system, and site conditions.

B. Attendees shall include contractor, fire extinguisher and cabinet installer, manufacturer technical representative, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
2. Coordinate sizes and locations of fire-protection cabinets with wall depths.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data, Fire Extinguishers: For each type of product.

1. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.

C. Product Data, Fire Extinguisher Cabinets: For each type of product.

1. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing recessed-, semirecessed-, or surface-mounting method and relationships of box and trim to surrounding construction.

D. Warranty: Sample of special warranty.

1.06 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements.

C. Maintenance Data: For fire-protection cabinets to include in maintenance manuals. Include test, refill or recharge schedules and re-certification requirements.

1.07 FIELD CONDITIONS

A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

1.08 WARRANTY

A. Installer Special Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this section.

1. Warranty Period: One year from date of Substantial Completion.

B. Manufacturer Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Failure of hydrostatic test according to NFPA 10 when testing interval required by NFPA 10 is within the warranty period.

b. Faulty operation of valves or release levers.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Fire-Rated Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

B. Comply with ADA requirements.

2.02 MANUFACTURERS

A. Provide fire extinguishers, cabinets, and accessories from a single manufacturer.

B. Acceptable Manufacturers: Subject to compliance with requirements.

1. J. L. Industries, Inc., an Activar Construction Products Group, Inc. Company.
2. Larsen Manufacturing Co. www.larsensmfg.com
3. Nystrom, Inc. www.nystrom.com.
4. Potter Roemer - Fire Protection Equipment, a division of Morris Group International.

2.03 FIRE PROTECTION CABINET

A. Basis-of-Design Product: Nystrom; Fire Extinguisher Cabinet.

1. Description: Steel unit construction, continuous piano hinge with 180 degree opening. Weld joints and grind smooth.
2. Cabinet Mounting: Recessed, 1/2 inch, Semi-Recessed, 2 inches, or Surface Mounted, as indicated.

B. Door and Frame:

1. Interior Locations at Conditioned Areas - Door and Frame: 0.036 inch (0.9mm) cold rolled steel.
   a. Color and Finish: White factory applied powder coat paint finish.

C. Tub: 0.036 inch (0.9mm) cold rolled steel

1. Color Finish: White factory applied powder coat paint finish.

D. Door Type: Full break glass with lock and break handle.

E. Door Glazing Type: Clear tempered safety glass.

F. Lettering: Vertical decal, red. Provide lettering or labeling as required by applicable code and code officials.

G. Latching: 90 degree turn handle.

1. Cabinets shall have cylinder locks with all cabinets keyed alike.

H. Cabinet Dimensions: Size to match extinguisher type.

I. Cabinet Mounting Hardware: Appropriate to cabinet, with pre-drilled holes for placement of anchors.

J. Fire Rating: Non-fire rated, or Fire rated for 1 hour or 2 hour combustible and non-combustible wall systems. Provide as indicated on Drawings and to match adjacent wall rating.

K. Fabrication: Weld, fill, and grind components smooth.

2.04 FIRE EXTINGUISHERS

A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
   1. Provide extinguishers labeled by UL (DIR) for purpose specified and as indicated.

B. Wet, Fine Mist Chemical Type Fire Extinguishers: Stainless steel tank, with pressure gauge.
   1. For use in kitchens and food service areas where required by applicable code and where indicated on Drawings.
   2. Class: K type.
   3. Size: 1.6 gallons (6 L). (6 liter)
   4. Temperature range: Minus 20 degrees F (Minus 29 degrees C) to 120 degrees F (49 degrees C).
   5. Finish: Polished stainless steel.

C. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gauge.
   1. Class: A:B:C type.
   2. Size: 10 pound (4.54 kg).
   3. Rated: 4A-60B:C.
   4. Temperature range: Minus 65 degrees F (Minus 54 degrees C) to 120 degrees F (49 degrees C).
   5. Finish: Manufacturer standard baked polyester powder coat.
   6. Color: Manufacturer standard red.

2.05 WALL MOUNTING BRACKETS

A. Wall Mounted Fire Extinguisher Brackets (non-cabinet mounted): Formed steel, chrome-plated. Anchors for mounting to wall substrates indicated on Drawings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify conditions before starting work.

B. Verify rough openings for cabinet are correctly sized and located.

C. Examine walls and partitions for suitable framing depth and blocking where recessed and semirecessed cabinets will be installed.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 PREPARATION

A. Prepare recesses for recessed and semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.03 INSTALLATION

A. Install extinguishers at date of Substantial Completion, indicating acceptable charge pressure and tagged to show charge date and service agent.

B. Install wall-hung extinguishers on wall mounting bracket. Secure bracket to wall structure with not less than two anchors.

C. Install in accordance with manufacturer's instructions.

D. Install cabinet-mounted extinguishers in cabinets using wall mounting bracket attached to back wall of cabinet.

E. Mounting Heights: As indicated on drawings and as follows.

1. Mounting heights shall meet ADA and NFPA requirements.

F. Unless otherwise indicated, provide recessed cabinets. If wall thickness is inadequate for recessed cabinets, provide semirecessed cabinets.

G. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.

H. Install cabinets plumb and level in wall openings.

1. Secure rigidly in place.

I. Place extinguishers in cabinets.

1. Locate with name and operating instructions visible on front of extinguisher.

J. Identification: Apply decals or vinyl lettering at locations selected by Architect.

1. Apply decals or vinyl lettering on field-painted cabinets after painting is complete.

3.04 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.

E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 11 3013

RESIDENTIAL APPLIANCES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Residential appliances.

1.03 REFERENCES

A. Reference Standards:

1. UL (DIR) - Online Certifications Directory

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

B. Attendees shall include contractor, appliance installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Manufacturer's data indicating dimensions, capacity, and operating features of each piece of residential equipment specified.

C. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.

D. Include all electrical and mechanical requirements for equipment.

E. Sample Warranties: For manufacturers' special warranties.

1.06 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements.

C. Maintenance Data: Provide manufacturer parts lists, operation, and maintenance instructions for the materials of this Section.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section, with not less than ten years of documented experience.

B. Electric Appliances: Listed and labeled by UL (DIR) and complying with NEMA Standards (National Electrical Manufacturers Association).

C. Gas Appliances: Bearing design certification seal of American Gas Association (AGA).

1.08 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this section.

1. Warranty Period: One year from date of Substantial Completion.

B. Special Manufacturer Warranty: Provide manufacturer standard warranty for each appliance indicating that products shall remain free from defects in material and workmanship during the warranty period indicated.

PART 2 PRODUCTS

2.01 SELECTIONS AND CHARACTERISTICS

A. Product Selections: As indicated on Drawings.

1. EQ-1: Refrigerator by GE Appliances. Model #GYE21JYMFS.
2. EQ-2: Dishwasher by GE Appliances. Model #GDT225SSLSS.
3. EQ-3: Coffee Maker by Kuerig. Model K-Supreme Single Serve.
4. EQ-4: Microwave by GE Appliances. Model #PCST22U1WSS.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify utility rough-ins are provided and correctly located.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Anchor built-in equipment in place.

3.03 ADJUSTING

A. Adjust to provide efficient operation.

3.04 CLEANING

A. Wash and clean in accordance with manufacturer recommendations prior to date of Substantial Completion.

3.05 PROTECTION

A. Protect installed items through date of Substantial Completion.

B. Clean, repair, or replace items to as new condition to the Architect's satisfaction.

END OF SECTION

SECTION 11 4000

FOODSERVICE EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Food Service Equipment

B. Related Sections:

1. Refer to Section 22 --- Mechanical --- for applicable provisions and sections regarding mechanical services, including, but not limited to, rough-ins, grease traps, steam traps, drain traps, atmospheric vents, valves, pipes and pipe fittings, ductwork, and other materials necessary to complete final connections to individual items as specified in this Section.

2. Refer to Section 26 --- Electrical --- for applicable provisions and sections regarding electrical services, including, but not limited to, rough-ins, wiring, disconnects and other materials necessary to complete final connections to individual items as specified in this Section.

1.2 DEFINITIONS:

1. Furnish --- Supply and deliver to Project Site, ready for unloading, unpacking, setup, assembly, & installation.

2. Install --- will include the actual unloading, unpacking, assembly, erecting/setting in place, anchoring, protecting, cleaning, and related operations on the equipment, made ready for final utility connections by other trades as indicated.

3. Contractor --- All references to “Contractor” in this Section 11400, shall refer to the Kitchen Equipment Contractor (also abbreviated as “KEC”). Reference to any other Contractor/Subcontractor, shall be specific such as General Contractor, Plumbing Contractor, Electrical Contractor, Mechanical Contractor, etc.

4. Component Hardware Group, Inc., Lakewood, N.J. will periodically abbreviated as “C.H.G.”

1.3 LAWS, ORDINANCES AND STANDARDS:

A. STANDARDS: Except & unless otherwise noted, comply with the following standards as applicable to the manufacture, fabrication, and installation of the work of this Section:

1. Air Conditioning Heating and Refrigeration Institute (A.H.R.I): Comply with the applicable regulations and references of the latest edition of standards for remote refrigeration systems, components and installation.

2. American Gas Association (A.G.A.): Comply with A.G.A. standards for gas heated equipment, and provide equipment with the A.G.A. seal. Automatic safety pilots to be provided on all equipment whenever available.

3. American National Standards Institute (A.N.S.I.): Comply with A.N.S.I. Z21-Series standards for gas-burning equipment, and provide labels indicating name of testing agency.

4. American National Standards Institute (A.N.S.I.): Comply with A.N.S.I. B57. 1 for L.P. gas cylinder connections, and with applicable standards of the Compressed Gas Association for compressed gas piping.

5. American National Standards Institute (A.N.S.I.): Comply with A.N.S.I. A40.4 and A40.6 for water connection air gaps and vacuum breakers.

6. American Society of Heating, Refrigeration and Air Conditioning Engineers (A.S.H.R.A.E.): Comply with the applicable regulations and references of the latest edition of standards for remote refrigeration systems, components and installation.

7. American Society of Mechanical Engineers (A.S.M.E.): Comply with A.S.M.E. Boiler Code requirements for steam generating and steam heated equipment; provide A.S.M.E. inspection, stamp and registration with National Board.

8. American Society for Testing and Materials (A.S.T.M.): Comply with A.S.T.M. C 1036 for flat glass.

9. American Society for Testing and Materials (A.S.T.M.): Comply with A.S.T.M. C 1048 for heat-treated flat glass, Kind HS, Kind FT coated and uncoated glass.

10. American Welding Society (A.W.S.): Comply with A.W.S. D1.1 structural welding code.

11. National Electric Code (N.E.C.): Comply with N.F.P.A. Volume 5 for electrical wiring and devices included with foodservice equipment, A.N.S.I. C2 and C73, and applicable N.E.M.A. and N.E.C.A. Standards.

12. National Electrical Manufacturers Association (N.E.M.A.): Comply with N.E.M.A. LD3 for high-pressure decorative laminates.

13. National Fire Protection Association (N.F.P.A.): Comply with the applicable sections of the N.F.P.A.-96 for exhaust hood, ventilators, duct and fan materials, hood wet chemical fire suppression systems, construction and installation, as well as any local codes and standards.

14. National Sanitation Foundation (N.S.F.): Comply with the latest Standards and Revisions established by N.S.F. for equipment and installation. Provide N.S.F. seal of approval on each applicable manufactured item, and on items of custom fabricated work.

15. Sheet Metal and Air Conditioning Contractor's National Association (S.M.A.C.N.A.): Comply with the latest edition of S.M.A.C.N.A. guidelines for seismic restraint of kitchen equipment (as required), and applicable local requirements.

16. Underwriters Laboratories (U.L.): For electrical components and assemblies provide either U.L. labeled & registered products or, where no labeling service is available, “recognized markings” to indicate listing in the UL “Recognized Component Index”.

17. Wet chemical fire suppression systems for exhaust hoods/ventilators shall comply with UL 300 Standard.

18. American with Disabilities Act (ADA): Comply with requirements, as applicable to this Project.

19. Refrigeration Service Engineers Society (R.S.E.S.): Comply with the applicable regulations and references of the latest edition of standards for remote refrigeration systems, components and installation as well as the 1995 requirements of the Montreal Protocol Agreement.

20. All refrigerants used for any purpose shall comply with the 1995 requirements of the Montreal Protocol Agreement, and subsequent revisions and amendments. No CFC refrigerants shall be allowed on this Project under any circumstances. HFC refrigerants and components shall be used where available. HCFC refrigerants and components, with a minimum 2010 phase-out date, and intermediate replacement refrigerants are to be used only when HFC refrigerants are not available.

21. All refrigeration components installation, repairs, and/or associated work on any refrigeration system, self-contained or remote, shall be performed by a Certified Refrigeration Mechanic.

22. Comply with all applicable local codes, standards and regulations, and any special local or job site conditions.

23. Jails, prisons, and all detention facilities shall comply with Correctional Standards as applicable to the specific Project. Verify the level of security and construction required with the Project Architect, and provide all items in compliance. As a minimum, no part or component of any item provided shall be easily removable and/or modified to be used as a weapon.

1.4 KITCHEN EQUIPMENT CONTRACTOR QUALIFICATIONS:

A. In addition to requirements of Section 1.2, submit evidence of compliance with the following qualifications and conditions:

1. Five (5) years minimum continuous operation under the same company name and ownership.

2. Have successfully completed at least (5) installation of similar scope and size during the last five (5) years, with Owner*s contact name and telephone number

3. Are manufacturers authorized dealer, able to purchase, distribute, and install all items specified with this Project.

4. Maintain an installation staff or have access to qualified personnel with a minimum of five (5) years experience in the installation of comparable size and scope projects.

5. Maintain or have access to a fabrication shop meeting NSF & UL standards and labeling requirements. If the fabricator will be a subcontractor for the KEC, they shall have five (5) years minimum experience in the fabrication of comparable size, scope, and level of quality projects. Contractor shall submit their company name and credentials to the Consultant and Owner, which shall have the right of approval or disapproval of this fabricator. Prior Approved Fabricators for this project are:

- Low Temp Industries, Jonesboro, GA.
- Titan Stainless, Waxhaw, NC
- Savannah Stainless Fabrication, Savannah, TN
- Atlanta Custom Fabricators, Douglasville, GA
- Stainless Innovations, Fort Smith, AR
- John Boos & Co. Custom Division, Effingham, IL
- Aero Manufacturing Custom Division, Clifton, NJ
- Vollrath/ACS Custom Fabrication Division, Newport, MN

6. Maintain a staff or have access to personnel experienced in the preparation of professional shop drawings and submittals as outlined in Section 1.9 below.

7. Maintain or have access to manufacturer*s authorized service personnel together with readily available stock of repair and replacement parts. Any subcontractors employed by Contractor for this project shall comply with these same qualification requirements.

8. The Architect, Owner and/or Foodservice Consultant for the project shall approve the Kitchen Equipment Contractor.

9. Foodservice Consultant for the project shall be:

Moynan Consulting, LLC
Tripp Moynan, Consultant
(985) 674-5710
Cell: (985)-264-6121

1.5 SUBSTITUTIONS:

A. All substitutions for itemized equipment specified will require prior approval of the Consultant and Owner. Such requests must be made in writing no later than (10) calendar days prior to bid due date. If approved, an addendum will be issued to all bidders at least (5) calendar days prior to bid due date. All requests for substitutions shall comply with conditions and requirements as stated in Section 1.6 below.

B. If custom fabricated items are submitted and accepted as a substitute to standard manufactured items, these items shall meet the specifications of the specified manufactured items, and in general, the fabrication sections which follows.

1.6 APPROVED SUBSTITUTIONS AND/OR LISTED ALTERNATES:

A. Substitutions approved by addendum as noted in Section 1.5, and/or any alternate manufacturers listed in the Itemized Specifications, may be utilized, with the following conditions:

1. The Project Documents are designed and engineered using the primary specified manufacturer and model. The Contractor shall assume total responsibility for any deviations required, due to the utilization of a substitution/alternate manufacturer or model, including, but not limited to, fitting alternates into the available space, providing directions to the General Contractor for required changes, and assuming any associated cost for utility, building, architectural, or engineering changes.

2. The Contractor shall be responsible for supplying the model, which is equal to the primary specified model in regards to general function, features, options, sizes, accessories, utility requirements, finish, operation, and listing approvals. If it is determined by the Owner or their appointed representative at any time during the

construction and installation, and prior to the final acceptance of the Project, that the substitution/alternate model submitted is not equal to the primary specified model, the Contractor shall assume all associated costs and implications required to replace the model submitted with the originally specified brand & model.

3. The Contractors bid will clearly list any substitutions or alternates to be used, including the manufacturer and model number. The proposal shall also include a manufacturers specification/data sheet for each substitution/alternate, with any and all deviations between the specified manufacturer and the alternate manufacturer itemized and listed. Submittal of a manufacturers specification sheets only shall not be acceptable as the data sheet. Complex alternates such as utility distribution systems, exhaust hoods, walkin coolers/freezers, custom fabricated items, etc., will require shop drawings specific to this project.

4. Inclusion of an alternate manufacturer in the Itemized Specifications is not intended to indicate that there is an equal alternate unit to match every primary specified unit. It shall be the responsibility of the Contractor to insure that the alternate unit submitted matches the primary specified unit, including all listed options and accessories, and meets the other project conditions, as stated above.

5. Manufacturers not approved for substitutions or listed as an approved alternate will not be permitted, unless submitted for prior approval, as described above in Section 1.5, paragraph A.

6. Submittal of an alternate manufacturer or model shall indicate agreement to the above stated conditions. At the Owner's sole discretion, failure to comply with any of these conditions, or to supply complete and correct data information, shall result in the Contractor being required to provide the originally specified manufacturer & model, at no additional cost to the Owner.

1.7 DISCREPENCIES

A. If discrepancies are discovered between the drawings and the specifications, regarding quality or quantity, KEC will notify the Consultant in writing of any discrepancies discovered and await clarification prior to proceeding with the items or areas in question.

1.8 SUBMITTALS:

A. Rough-In Drawings:

1. Submit as PDF documents for consultant review. After approval, reproduce and supply the required number of distribution prints for construction purposes.

2. Submit minimum 1/4 inch per foot scale rough-in drawings for approval. These drawings shall be dimensioned; showing location of ducts, stubs, floor and wall sleeves, for ventilation, plumbing, steam, electrical, refrigeration lines, and concrete base/recess/curb dimensions as required for equipment.

3. Verify mechanical, electrical and ventilating rough-in and sleeve penetration locations at project site as required.

4. The Contractor shall be solely responsible for the accuracy of the information provided in their submittal packages.

5. In the event rough-ins have been accomplished before a contract is awarded to KEC, the Contractor shall check the existing facility and make adjustments to their equipment to suit job site conditions and utilities, where possible. If this is not possible, immediately send letter with reasons, possible solutions, and any costs associated with the proposed solutions, to the Owner and Consultant.

B. Shop Drawings:

1. Submit as PDF files for review and approval; if available supply AutoCAD “DWG” format as well. After approval, reproduce and supply the required number of distribution prints for record and construction purposes.

2. Submit shop drawings for items of custom fabrication included in this contract. Shop drawings shall be submitted at minimum 3/4 inch per foot scale and shall show dimensions, materials, construction details, installation and relation to adjoining work or equipment requiring cutting or close fitting. Shop drawings shall also indicate any and all reinforcing, anchoring and related work required for the complete installation of these items.

3. Before proceeding with the fabrication of any item, the Contractor will verify all necessary dimensions and details, with all job site dimensions and conditions considered.

C. Submittals:

1. Submit PDF file of full Submittal Manuals with a cover sheet and detailed information on every item included in the Itemized Equipment List. This information shall include, but not limited to, item & model numbers, basic description, quantity required, all options and accessories to be provided, exact utility requirements, manufacturer specification sheets, reference to specific shop drawings, etc. Mark each data sheet with the applicable project equipment item number. Each data sheet to include N.E.M.A. plug and receptacle configuration for applicable items. Every cover sheet and associated

detailed submittal shall provide sufficient and complete information to verify that the Contractor is providing each item in compliance with the Contract documents.

2. Architect's/Consultant's review of shop drawings and submittal manuals is for general conformance & compliance with the design concept and contract documents. Markings and/or comments shall not be construed as relieving the Contractor from compliance with the contract documents. The Contractor remains solely responsible for all details and accuracy, and for performing their work in a safe, satisfactory, and professional manner.

1.9 OPERATION AND MAINTENANCE DATA MANUALS:

A. Operation & Maintenance Manuals. Contractor will supply three (3) sets of manuals for items of standard manufacture on or before the date of final acceptance of installation by Owner. Manuals are to be in alphabetical order according to manufacturer, bound or in heavy-duty binders, with alphabetical divider tabs.

B. Submit with the operation and maintenance manuals a complete list of local service agencies for included manufacturers, complete with telephone numbers.

C. Provide video tapes for maintenance, training, operation, etc. when available from the individual manufacturers.

1.10 AS-BUILT/RECORD DOCUMENTS:

A. Maintain one record set of Foodservice Equipment Plans with any related corrections, revisions, additions, deletions, changes, future items, etc. noted during construction and installation. Provide an “as-built” set of reproducible vellums or bond drawings, and electronic computer disk (CAD) form.

B. Provide one (1) final set of Product Data & Submittal Manuals with any related corrections, revisions, additions, deletions, changes, future items, etc. noted during construction and installation as a specifications record set..

C. Provide two (2) binders containing all manufacturers' operational/installation manuals, containing any recommended preventative maintenance information. These binders shall be tabbed by item numbers corresponding to the project drawings, with a table of contents at the front, with a list of factory authorized service agencies for all items.

D. In addition to above, provide any available manufacturers' CD's, DVD's, USB sticks, etc. containing operational and/or maintenance videos that may be available, and a list of any web site links or portals for the same type of information.

E. These documents shall be provided to the Owner before the date of final acceptance of installation.

1.11 SCHEDULE:

A. Time is of the essence in this agreement and acceptance constitutes a guarantee that the Contractor can and will obtain materials, equipment and manpower, upon notice to proceed, to permit overall completion of the entire building project on schedule. The Contractor shall coordinate their work with the progress schedule, as prepared and updated periodically by the General Contractor or Construction Manager.

B. Anticipated delays, not through fault of the KEC, shall be noted in a written notification to the Foodservice Consultant and the Architect, immediately upon the realization by KEC that delays are possible, likely or probable.

C. Failure of manufacturers to meet promised delivery dates will not grant relief to the Contractor for failure to meet schedules, unless the it can be proven in writing and with supporting data (i.e., proof of dates orders were placed), that orders were received by the manufacturer, with reasonable lead times.

D. Extra charges from rush orders, special handling, overnight UPS/Fedex, air shipments, etc. in order to meet the required schedule will be paid by the Contractor if insufficient time was allowed in placing factory orders.

1.12 PRODUCT HANDLING:

A. Deliver all items materials (except bulk materials) in manufacturer's original containers wherever possible, fully identified with manufacturer's name, model number, trade name (pattern), type, class, grade, size, color, project item number, etc.

B. Storage of Materials, Equipment And Fixtures. Contractor is responsible for receiving and warehousing of equipment and fixtures, and holding items until job site is ready for delivery and installation. Store materials, equipment and fixtures in sealed containers, off the ground and under cover, protected from damage and weather.

C. Handling Materials & Equipment. Verify and coordinate conditions at the job site, particularly door and/or wall opening sizes and clearances, to assure access for all equipment. Pieces too large for existing site conditions shall be hoisted, crane-lifted, or otherwise handled as required. All special handling equipment charges shall be arranged for and paid for by the Contractor and is to be included in bid price, unless conditions changed at job site after acceptance of bid, and through no fault of the KEC.

1.13 PRODUCT PROTECTION:

A. The Contractor is responsible during the progress of the project to protect their equipment against theft or damage, until final acceptance by the Owner. Items should not be delivered to the job site before the site is ready for installation, unless by request of the Owner or Contract Manager. All scheduled deliveries should be signed for, and delivery condition noted, by the Owner or Contract Manager.

B. Use all means reasonable to protect all items before, during, and after installation and protect the associated work and materials of the other trades.

C. Pre-fabricated walk-in cabinets, usually on-site and installed in advance of the rest of the equipment, are not to be available for or used as general storage by other trades; however, KEC may store their own items for project in these cabinets if necessary, assuming proper precautions are taken to insure no damage to cabinet occurs. These cabinets should be locked by Contractor's personnel before leaving the site, and the door keys removed and retained until they are to be turned over to the owner. Damage and theft resulting from the failure to secure boxes shall be repaired or replaced at Contractor's own expense.

1.14 WARRANTIES:

A. Unless otherwise noted in Itemized Equipment Specifications, Section 3, items furnished shall be fully guaranteed against defects in workmanship and material(s) for one full year from the date of the final acceptance of installation by Owner. Should a Temporary Certificate Of Occupancy be issued for partial completion of work, the items furnished within that designated area shall be under warranty from the date of issue of that Certificate. The Contractor or their service agent will make repairs and replacements without charge to the Owner, and within a reasonable time.

B. Additional Warranty: Refrigeration systems and components shall include complete start-up, initial adjustment, and one-year service/labor contract (NOT including normal cleaning and maintenance), in addition to the regular one-year warranty as stated above, plus additional four-year warranty on sealed portions of condensing units (parts only, not including labor). This shall include all refrigerators, ice cream makers and cabinets, ice makers, freezers, dispensers, walk-in coolers/freezers compressors, or any other items with refrigeration systems, either self-contained and remotely refrigerated.

PART 2 - EQUIPMENT

2.1 GENERAL:

A. Refer to schedules on Foodservice Drawings and Part 3.8, Itemized Equipment Specifications, included below in this Section.

2.2 MATERIALS:

A. Quality Standards for Metals:

1. Stainless Steel: AISI Type 304, #4 finish where exposed, #2B finished where not exposed.

2. Galvanized Steel Sheet: ASTM A526, except ASTM A527 for extensive forming; ASTM AS 25, G90 zinc coating, chemical treatment.

3. Steel Sheet: ASTM A569 hot-rolled carbon steel.

4. Galvanized Steel Pipe: ASTM A53 or ASTM A120, welded or seamless, schedule 40, galvanized.

5. Steel Structural Members: Hot rolled or cold formed, carbon steel unless stainless steel is indicated.

6. Aluminum: ASTM B209/B22 1 sheet, plate and extrusions (as indicated); alloy, temper and finish as determined by manufacturer/fabricator, except 0.40-mil natural anodized finish on exposed work unless another finish is indicated.

B. Quality Standards for Plastic Laminates:

1. EMA LD3, Type 2, 0.050” thick, unless otherwise indicated. Color and texture as selected by the Architect/Interior Designer.

2. Comply with N.S.F. Standard No. 35.

3. Adhere to substrate materials with manufacturer recommended waterproof and heat proof contact cements only.

4. Applied directly over 3/4" thick close grained plywood, Grade AA/B@ or better, of selected, smooth, sanded stock to ensure a smooth ripple-free laminated surface; “OSB”, “MDF” or particle board panels are not considered acceptable.

5. If specified plywood substrate is unavailable, submit specifications and sample of alternate material for approval.

6. Exposed faces and edges shall be faced with 1/16” thick material. Corresponding backs are to be covered with approved backing material. No unfinished exposed plywood surfaces will be acceptable.

7. All plastic laminate surfaces are to be finished without waves and unsightly joints.

C. Hardwood Work Surfaces:

1. Laminated edge grained hard maple (Acer saccharum), NHLA First Grade with knots, holes and other blemishes culled out, kiln dried at 8 percent or less moisture, waterproof glue, machined, sanded, and finished with N.S.F. approved oil-sealer. Lacquered finishes are not acceptable.

D. Solid Surface Materials:

1. Provide 1/2” thick 100% homogeneous filled acrylic material meeting ANSI124.6 Type 6, as manufactured by Dupont Company under brand/trade name of Corian. Colors and patterns as selected by the Architect/Interior Designer. Material must comply with N.S.F. Standard No. 51.

2. Alternate brands by WilsonArt or Formica may be specified by Architect/Interior Designer, and are considered equal to Corian brand, as long as in minimum thicknesses as listed above.

3. Acrylic adhesive shall be used for all joints, of proper color to render seam virtually invisible after sanding and polishing.

4. To be applied directly over 3/4" thick close grained plywood, Grade AA/B@ or better, of selected, smooth, sanded stock; “OSB”, “MDF” or “particle board” panels are not acceptable. Additional bracing and support shall be provided where recommended by that manufacturer.

5. Fabrication shall be by a fabricator trained by Dupont factory authorized training personnel and Certified as a Commercial Corian Fabricator. If other brands of materials are specified, fabricator will have similar certification from that manufacturer. Installation shall be by an installer trained by Dupont factory authorized training personnel and Certified as a Commercial Corian Installer. If other brands of materials are specified, installer will have similar certification from that manufacturer.

6. All fabrication and installation of Corian, and all components attached to or installed in or through Corian shall be in compliance with manufacturer*****s instructions and the Dupont Corian Food Service Guidelines and Design Manual. Of particular concern shall be the sections, details, and instructions on the installation of drop-in or built-in hot or cold components. If other brands of materials are specified, similar recommended guidelines from that manufacturer are to be likewise followed.

E. Insulation:

1. For low temperature applications, such as ice bins, cold pans, or fabricated under counter freezers, use urethane, rigid board foam or foamed-in-place; not less than 2 inches thick, except that vertical surfaces of cold pans and ice bins may be 1 inch thick. Insulation shall be bonded at joints with urethane or polyurethane expanding foam to

fill all voids and prevent condensation on exterior. Polystyrene foam will not be acceptable.

2. For refrigerated applications such as fabricated under counter refrigerators, use urethane rigid board foam or foamed-in-place, minimum 2 inches thick. Insulation shall be bonded at joints with urethane or polyurethane expanding foam to fill all voids and prevent condensation on exterior. Polystyrene foam will not be acceptable.

3. For heated type applications, use mineral wool, minimum 1 inch thick.

4. At refrigerated counter tops and refrigeration compressors where subject to heat from cooking equipment above, use minimum of 1" thick BNZ Materials, Inc. “Marinite-I”, or equal high-temperature, calcium silicate & fiber structural board insulation to insulate as well as support underside of top. This material shall be sandwiched between a 14 gauge stainless steel top (exterior) and 18 gauge bottom, double-pan enclosure, tack-welded on underside and sealed.

5. All insulation shall be fully encased or enclosed.

F. Joint Materials:

1. Sealants: Silicone based, liquid elastomeric sealant, non-solvent release type. Sealants shall be N.S.F. Listed & F.D.A Approved for use in food zones. C.H.G. M90-Series or equal. Installation shall comply with applicable requirements of N.S.F. Standards.

2. Gaskets: Solid or hollow (but not cellular) neoprene or P.V.C., light grey, self-adhesive or prepared for either adhesive application or mechanical attachment.

G. Paints And Coatings:

1. Provide the types of painting and coating materials which, after drying or curing, are suitable for use in conjunction with foodservice, and which are durable, non-toxic, non-dusting, non-flaking, mildew resistant, and comply with all governing regulations for foodservice.

2. Sound Deadener. NSF listed sound deadening material, C.H.G. #Q75-1366 latex sound deadener (or equal), for internal surfaces of metal work, and underside of metal counters, dishtables, sink bowls and drainboards; C.H.G. #Q85-5225 “tacky tape” between work top and underbracing or framing.

3. Pretreatment. All metal surfaces to be painted are to be cleaned and/or chemically etched as per the recommendations of the manufacturer for the finish coating that is to be applied.

4. Raw metal surfaces are to be coated with a suitable primer/filler paint before application of finish coat.

2.3 FABRICATED PRODUCTS:

A. Hardware:

1. General quality not less than ANSI 156.9 Type 2 (Institutional), satin finish stainless steel or dull chrome finish on brass, bronze, or steel.

2. Hinged Door Hardware: Hinged doors shall be mounted with heavy duty N.S.F. approved hinges, C.H.G. Model No. as specified, with C.H.G. Model No. P62-1010 pulls, or approved equal. Catches shall be heavy-duty magnetic type, C.H.G. #M30-2400 or equal, unless otherwise indicated.

3. Drawer Hardware: Slides to be 200 pounds minimum capacity per pair, 300 series stainless steel, full extension, side-mounting, self-closing type, with stainless steel ball-bearings and positive stops. C.H.G. S52-Series, or approved equal. Drawer pulls shall be C.H.G. Model No. P63-1012, S/S full grip type with frame beveled edge, or approved equal.

4. Sliding Door Hardware: Sliding doors shall be mounted on large, quiet ball bearing rollers with quiet nylon wheels, C.H.G. #B58-5513/ B58-5523 or equal, in 14-gauge stainless steel overhead tracks. Rollers to be easily replaceable and doors to be removable without the use of tools (lift out).

5. All hardware used must be identified with manufacturer*****s brand name and part number on shop drawings so that broken or worn parts may be easily obtained and replaced.

B. Casters:

1. Type and size as specified on drawings and specifications, N.S.F. approved, not less than 5” diameter; heavy-duty, ball-bearing, solid or disc wheel with non-marking grease proof rubber, neoprene or polyurethane wheel as specified. Minimum width of tread shall be 1-3/16”. Minimum weight capacity shall be 250 pounds per caster unless otherwise noted in itemized specifications.

2. Unless otherwise indicated, each equipment item on casters is to be supplied with two (2) swivel-type casters and two (2) swivel-type casters with foot brakes; brakes are to be on front casters for equipment against walls, and on opposing corners of equipment not normally against walls.

C. Plumbing Fittings & Accessories:

1. General: Where exposed or semi-exposed, provide bright chrome plated brass or polished stainless steel; copper or brass where not exposed. PVC acceptable for cold water drains (Ice bins, soda fountains, condensate from refrigeration) only where allowed by local codes; PVC not acceptable on any drains where hot water will flow, or for pressured water lines.

2. Vacuum Breakers: Provide with foodservice equipment items where specified.

3. Waste Fittings/Drains. Unless otherwise indicated, furnish lever or twist waste drains as specified on all sinks, C.H.G. D10/D50 series or equal, with removable flat strainers and 2" IPS outlet size. If basket drains are specified, will be all S/S construction, C.H.G. #E38-1012 (18-8 S/S) or equal.

D. Electrical Materials and Components:

1. General: Provide standard materials, devices and components as recommended by the manufacturer or fabricator, selected and installed in accordance with N.E.M.A. standards and recommendations; and as required for safe and efficient use and operation.

2. Confirm all electrical requirements for project, including, but not limited to, actual voltages available, single or three phase availability, etc.

3. Electrical work for custom fabricated equipment shall be completely pre-wired to a junction or pull box mounted on the equipment, all wires clearly marked and labeled for outlet or item served. Counters should be wired for a single connection point at the job site wherever possible and specified. Verify local requirements for U.L. Listing on complete assembly, and provide if required.

4. Components shall bear the U.L. label, or be U.L. recognized, with the whole item being U.L. Listed.

5. Custom fabricated refrigeration units shall be provided with vapor proof light fixtures with shatterproof polycarbonate lamp shields, C.H.G. L20-1010 or equal, and automatic switches. All wiring shall be concealed.

6. Controls, Switches, Receptacles. Provide recognized commercial grade signal lamps, switches, controls and switches as indicated. All such units to be complete with pilot lights and permanent signs and graphics to assist the user of each item. Provide stainless steel cover plates on all electrical boxes and switches; these are always to be located out of heat zones, easily accessible, and in locations that prevent accidental contact by staff.

7. Internal Wiring of Fixtures and Equipment:

a. The Contractor shall be responsible for internal wiring of electrical devices built into fabricated equipment items. Wiring to be enclosed in metal conduit or an electrical chase where indicated, to an accessible pull-box, with all wires clearly labeled. For any item shipped in sections, all wiring shall be properly connected internally, to a single connection point, and verified by the Contractor.

b. Furnish warewashers and conveyors internally wired to junction box or distribution panel as specified; including all required switches, motors, immersion heaters, solenoids, and other components required for proper operation.

c. Where light fixtures are specified or detailed as part of counters, cases or fixtures; light fixtures, lamps and shields shall be furnished and installed. If fluorescent light fixtures are specified, warm white lamps are to be used (unless otherwise specified) and ballasts shall be included. Shatter shields shall be provided for all light fixtures.

d. All wiring shall conform to National Electrical Code and be U.L. Listed.

e. Wiring for walkin refrigerator and freezer cabinets shall be U.L. approved type from exterior junction box to internal components, with insulation, unless local codes require metallic conduit (EMT or Greenfield). For cooler and freezer applications, Seal-Tite Flex or approved equal shall be used. Convenience outlets, lighting receptacles, and door switches, shall be mounted weatherproof boxes. All penetrations to be insulated with expanding foam and sealed to prevent condensation moisture buildup.

8. Exposed flexible steel conduit on kitchen equipment shall be neoprene jacketed Seal-Tite conduit equal to Anaconda type “UA”, U.L. approved, complete with approved liquid-tight connectors on each end, and designed to provide electrical grounding continuity.

9. Exposed electrical conduit used in kitchen wet area applications, except for flexible connections, shall be rigid galvanized steel. Thinwall conduit (EMT) shall not be permitted for wet areas. Exposed outlet boxes shall be liquid-tight type, with threaded hubs.

10. Convenience Outlets & Power Receptacles:

a. Make cutouts and install appropriate boxes or outlets in fabricated fixtures, complete with wiring, conduit, outlet and stainless steel cover plate.

b. Outlets and plugs shall conform to N.E.M.A. Standards.

c. Electrical outlets and devices shall be first quality “Specification Grade”.

d. GFCI outlets shall be furnished where adjacent to sink compartments, as per the National Electrical Code.

11. Plugs and Cords: Where cords and plugs are provided, they shall comply with National Electrical Manufacturer*s Association (N.E.M.A.) requirements. Indicate N.E.M.A. configuration for each applicable item.

12. Heating Equipment:

a. Electric heating equipment shall be so installed as to be readily cleanable or removable for cleaning.

b. Steam heated custom fabricated equipment shall be a steam coil/heat exchanger design, and will include all necessary control valves, components, and moisture trap located and be installed and located in an accessible position.

13. Motors are to be totally enclosed type, except drip-proof type where not exposed to a dust or moisture condition; ball bearings, sleeve bearings acceptable on small timer motors; moisture resistant windings; horse-power and duty-cycle ratings as indicated.

14. Refer to drawings and individual equipment specifications for total electrical loads and ratings.

2.4 FABRICATION OF METALWORK:

A. General Fabrication Requirements:

1. Remove burrs from sheared edges of all sheet metal to eliminate cutting hazard. Maintain flat, smooth surfaces, without damage to finish.

2. Reinforce metal at locations of hardware and accessory attachments wherever metal is less than 14 gauge thickness, or requires mortised or recessed installation. Weld in place on concealed side of work. Reinforcements will not show on finished, exposed surfaces.

3. Exposed screws or bolt heads, rivets, or butt joints filled with solder are not acceptable. Where fasteners are permitted, provide Phillips head, flat or oval head machine screws. Cap threads with acorn nuts, unless fully concealed & inaccessible. Provide nuts and lockwashers where necessary or indicated. Match fastener material and finish with finish of metal being fastened.

4. Where components of fabricated metal work are indicated to be galvanized or steel, and involve welding of the metal, complete the fabrication and clean all welding slag,

then paint with a high grade aluminum color, rust-preventative spray paint, such as C.H.G. #M92-1012, or Rust-Oleum #V2185 “Hard Hat” Zinc Rich Cold Galvanizing Spray.

B. Welding And Soldering:

1. Materials 18-gauge or heavier shall be welded. Seams and joints are to be shop welded or soldered as indicated. Welds must be ground smooth and polished to match original finish.

2. Where galvanizing has been burned off, the weld shall be cleaned and then painted with a high grade aluminum color, rust-preventative spray paint, such as C.H.G. #M92-1012, or Rust-Oleum #V2185 “Hard Hat” Zinc Rich Cold Galvanizing Spray.

3. Provide removable panels for access to mechanical and electrical service connections and components concealed inside equipment, but only where other means of access is not possible and not indicated through other work.

4. Where ends of equipment, rear or end splashes, shelves, etc., are open after fabrication, they are to be enclosed by forming metal and welding, adding filler sections if necessary, to close entire opening flush to walls or adjacent fixtures or equipment.

5. Coved Corners: Stainless steel foodservice equipment shall have minimum 1/4" radius coves in horizontal and vertical corners, and intersections, and constructed to N.S.F. Standards.

6. Quality of Work. All work to be of the highest quality in the trade. Field verify all dimensions before fabricating, adjust where necessary to conform to building and job site conditions, neatly fit around pipes, offsets and other obstructions. Fabricate only in accordance with approved shop drawings. Excessive distortion from welding will not be acceptable.

C. Metal & Gauges:

1. Unless otherwise indicated in Itemized Equipment Specifications, fabricate exposed metalwork of stainless steel; and fabricate the following components from the gauges of metal as indicated

2. Use 14-gauge material for all sinks, drainboards, table and counter tops, reinforcements, gusset plates, and hat channels.

3. Use 16-gauge material for all wall shelves, undershelves, inserts, trays, and single-pan drawers or door fronts.

4. Use 18-gauge material for all wall cabinets, table or counter base cabinets, skirting, enclosure panels, trim strips and corners, double-pan drawer fronts or doors, hoods, ventilators, access panels or covers.

D. Fabrication Methods:

1. Fabricate metal work surfaces by forming and welding, to provide seamless construction, using welding rods matching sheet metal, or TIG-welding on stainless steel using S/S filler rods, grinding and polishing to match surrounding surfaces. Where necessary for disassembly, provide waterproof field joints, with gaskets and concealed bolting. If Field-Welded joint is indicated, provide straight, smooth raw edge.

2. Reinforce work surfaces at a minimum 30 inches on center in both directions with galvanized or stainless steel structural members as indicated.

E. Top Construction:

1. Metal tops shall be one-piece welded construction, including joints only where absolutely necessary.

2. Fasten tops to supporting frames, cabinet bases or structural members with C.H.G. Q36-1100 Series S/S welded stud bolts (10-24 thread) and Q33-1024 zinc-plated hex nut/lockwashers or Q31-1024 S/S cap nuts as specified.

3. Properly designed bolt together field joints, trim strip, or other commercial joint material to suit requirements shall be used only where it is specified.

4. Welded Field Joints, where specified, will be welded, ground, and polished to match surrounding surfaces. Excessive distortion from welding will not be acceptable.

F. Structural Components

1. Unless otherwise indicated, provide framing of minimum 1-1/4" O.D. round pipe or tubing, with mitered and welded joints and gusset plates, ground smooth. Provide 16 gauge stainless steel tube for exposed framing, and galvanized steel pipe for concealed framing. Where indicated, hat channels of 1" x 4" x 1" are to be used, of gauge and material specified, and attached to tops as outlined in Section 2.04, D-2 above.

G. Field Joints:

1. For any field joint required because of size of a particular item, use a butt-joint, reinforced with formed angles of same material on underside, attached with stud bolts as outlined in Section 2.04, D-2 above. Bolt together with concealed stainless steel bolts and nuts, with waterproof gasket between angles, and seal with food grade, NSF-listed silicone sealant (C.H.G. #M90-1012). If specified as field welded joint, TIG weld and fill with S/S filler rod, grind and polish to match surrounding material.

H. Open Pipe Bases:

1. Unless otherwise specified, construct open pipe bases of 1-5/8" O.D., 16-gauge, type 304 stainless steel tubing. Fit legs with C.H.G. #A10-0851 stainless steel adjustable bullet feet or A10-0854 stainless steel adjustable flanged feet with mounting holes as indicated. Legs are to be spaced sufficiently close enough together to support weight of items on top of table or counter, and in no case more than 6'-0" on centers.

I. Legs And Crossrails:

1. Equipment legs and crossrails shall be 1-5/8" O.D., 16-gauge, type 304 stainless steel tubing. Fit legs with C.H.G. #A10-0851 stainless steel adjustable bullet feet or A10-0854 stainless steel adjustable flanged feet with mounting holes as indicated. Crossrails are to be notched at end, and welded to legs as indicated. All welds are to be continuous, ground smooth and polished to match surrounding material; tack welds are not acceptable. Where flanged feet are specified, anchor to floor with either expanding driven in stainless steel pins or stainless steel lag bolts with expanding anchors as indicated.

2. Stainless Steel Gussets to be C.H.G. #A16-0206, 16-gauge S/S exterior, to accept 1-5/8" O.D. S/S tubing, with Allen set screw for fastening and adjustment. Reinforced with 12-gauge mild steel insert welded in interior. To be welded to framing members as indicated

3. Legs shall be fastened to equipment with gussets, as follows:

4. Sinks to have gussets TIG-welded to stainless steel channels (unless otherwise indicated), 14-gauge or heavier, anchored to either drainboards or sink bowls as indicated with stainless steel welded stud bolts as outlined in Section 2.04, D-2 above.

5. Metal Top Tables and Dish Tables to have gussets TIG-welded to stainless steel channels (unless otherwise indicated), 16-gauge or heavier, anchored to top with stainless steel welded stud bolts as outlined in Section 2.04, D-2 above.

6. Wood Top Tables to have gussets TIG-welded to stainless steel channels, 16-gauge or heavier, anchored to underside of top with stainless steel screws through slotted holes to allow for top expansion.

J. Shelves:

1. Construct solid shelves under pipe base tables of 16 gauge stainless steel, with 1-1/2" turn-down front and ends, with bottom edges turned in additional 2" @ 45-degrees, and 1-1/2" turn-up at rear, unless indicated otherwise. Notch and fully weld to pipe legs as necessary, ground smooth and polished to match surrounding material; tack welds are not acceptable. In fixtures with enclosed bases, turn up shelves at both rear and sides.

K. Sinks:

1. Fully fabricated, 14-ga. Stainless Steel construction. Deep Drawn or stamped bowls not acceptable. Bottoms creased and pitched toward drains. Form back, bottom and front of one piece, with ends and partitions welded into place. Partitions to be double thick, 1" minimum space between walls. Multiple compartments shall be continuous on the exterior, with overlay 18-ga. Stainless Steel face panel.

2. Cove interior vertical and horizontal corners of each tub not less than 3/4 inch radius, die formed. Outer ends of drainboards to have roll rim risers not less than 3 inches high.

3. Punch rear splashes with holes for faucets as indicated 2-1/2” below top edge. Verify center-to-center spacing with faucet specified. Sink Bowl rear walls to be punched for overflow drain head if so instructed in itemized specifications below.

L. Plumbing Fixtures:

1. Unless otherwise indicated, furnish lever or twist waste drains as specified on all sinks, C.H.G. D10/D50 series or equal, with removable flat strainers and 2” IPS outlet size. If basket drains are specified, will be all S/S construction, C.H.G. #E38-1012 (18-8 S/S) or equal.

2. Handle (lever or twist, as specified) to extend to front edge of sink. Handle to be supported and protected by stainless steel bracket where indicated. No riveting, screws or soldering permitted to fit drains to sinks, with all parts of drains easily removable for servicing and replacement.

3. Water pans for hot food tables shall be fitted with 1” drains with chrome-plated brass stand pipes or manifolded together to a single gate valve for draining as indicated.

4. All faucets furnished with equipment included in this Section shall be lead free and comply with NSF Standard #61, Section #9. Where the itemized specifications list a faucet by manufacturer and model, the Contractor shall verify that the listed faucet complies with this requirement. If the listed faucet does not comply, the Contractor shall notify Consultant immediately and submit for approval a similar model which does comply, from the same manufacturer where possible.

M. Workmanship:

1. Best quality in the trade. Field verify dimensions before fabricating; conform all items to dimensions of building; neatly fit around pipes, offsets and other obstructions.

2. Fabricate only in accordance with approved shop drawings, showing pipes, obstructions to be built around, and location of utilities and services. Excessive distortion from welding will not be acceptable.

N. Enclosures:

1. Provide enclosures, including panels, housings, skirts, trim panels, operating components and mechanical and electrical devices associated with the foodservice equipment, unless specifically indicated otherwise.

2. Where equipment is exposed to customer view, provide enclosure of service lines, operating components and mechanical and electrical devices.

O. Casework:

1. Unless otherwise indicated, provide each unit of casework (base, wall, overhead and free-standing cabinets) with a completely enclosed metal cabinet, including fronts, backs, tops, bottoms, and sides.

2. Bases shall be made of 18-gauge stainless steel, with 16-gauge bottoms and shelves. Unexposed backs and structural members are to be either S/S or galvanized.

3. Provide adjustable standards for positioning and support of shelves in casework, unless otherwise specified as fixed or non-adjustable; bottom shelf of cabinet mounted on legs or as specified. Turn back of shelf units up 1-1/2" and hem; front and sides to be turned down and hemmed also, welded at front corners, ground and polished to match. Reinforce shelf units to support a minimum 40 pounds per square foot loading.

P. Doors:

1. Metal doors shall be double-cased stainless steel, 18-gauge with corners welded, ground smooth and polished. Inner pan shall be fitted tightly into outer pan with a sound-deadening material such as Styrofoam used as a core. The two pans shall be tack welded together and joints sealed. Door thickness to be 3/4", and be fitted with C.H.G. Model No. P62-1010 pulls, or approved equal.

2. Hinged doors shall be mounted on heavy-duty N.S.F. approved hinges, or as noted on plans or specifications.

3. Wood doors are to be constructed as detailed. If Formica or other plastic surfaces are used, sides and backs must be laminated or sealed and varnished as specified on plans or specifications.

Q. Drawer Assemblies:

1. Assemblies shall consist of removable drawer body mounted in a ball bearing slide assembly with fully enclosed housing. Slide assembly consists of one pair of 200-lbs. Capacity, 300 series stainless steel, full extension, side-mounting, self-closing type, with stainless steel ball-bearings and positive stops. C.H.G. S52-Series, or approved equal. To have side and back enclosure panels, front spacer angle, two drawer carrier angles, secured to slides and stainless steel front. Drawer pulls shall be C.H.G. Model No. P63-1012, S/S full grip type with frame beveled edge, or approved equal.

2. Unless otherwise indicated, drawers for general storage are to have a removable 20" x 20" x 5" deep pan, either C.H.G. #S81-2020 (stainless steel) or S80-2020 (heavy duty gray thermoplastic). Drawers intended to hold food products shall be designed to hold standard 12" x 20" stainless steel or polycarbonate food pans up to 4" deep, in a stainless steel assembly.

3. Drawer fronts are double-pan construction, ¾" thick, 18 gauge stainless steel, welded, ground, polished. Back pan is tightly in-fitted, tack welded & sealed. Sound deaden with rigid insulation material.

4. Provide drawers with replaceable soft neoprene bumpers or for refrigerated drawers, a full perimeter soft gasket.

R. Enclosed Bases:

1. Where cabinets are to be curb base mounted, prepare for support on channel frame without legs, and for anchorage and sealant application, as required for a completely enclosed and concealed base.

S. Support from Floor:

1. Equip floor supported mobile units with casters, and equip items indicated as roll-out units with manufacturers standard one-directional rollers. Otherwise, and except for closed-base units, provide pipe or tube legs as specified, with adjustable bullet or flanged feet, with 1-1/2" adjustment range (concealed threading).

T. Shop Painting:

1. Clean and prepare metal surfaces to be painted; remove rust and dirt. Apply treatment to zinc coated surfaces which have not been mill phosphate coated. Coat welded and abraded areas of zinc-coated surfaces with a high grade aluminum color, rust-preventative spray paint, such as C.H.G. #M92-1012, or Rust-Oleum #V2185 "Hard Hat" Zinc Rich Cold Galvanizing Spray.

2. Apply 1.5 mil (dry film thickness) metal primer coating, followed by (2) coats, each 1.0 mil (dry film thickness) metal enamel finish in specified brand & color.

U. Sound Deadening:

1. Sound deaden underside of metal tops, drainboards, undershelves, cabinet interior shelves, etc., above the underbracing, reinforcing, or framing only.

2.5 REFRIGERATION

A. General:

1. Furnish either single or multiple condensing units, or rack refrigeration system as specified or recommended by the manufacturer for particular items on equipment schedule. Furnish all components necessary for a complete installation of the system, including coils, receivers, compressors, motors, motor starters, mounting bases, vibration isolation units, fans, dryers, valves, piping, insulation, gauges, winter control equipment , etc..

2. Refrigerants to be used must be R448A or other current EPA listed ”SNAP23” Regulation approved refrigerants. Use of any delisted older refrigerants is not allowed.

3. The minimum outdoor operating ambient temperature for design of units is -10 degrees Fahrenheit, unless otherwise specified. The maximum indoor design temperature for operation of compressor units is 95 degrees Fahrenheit. The maximum outdoor ambient design temperature shall not be less than 100 degrees Fahrenheit. Special attention is to be given to conditions at mounting locations of condensing units, such as sun exposure, restricted airflow and ventilation, fences, walls, roof color and materials.

B. Components:

1. Coils: Coils for fabricated refrigerators shall have vinyl plastic coatings, stainless steel housings, and are to installed in such a manner as to be serviceable and replaceable.

2. Expansion Valves: Remote refrigeration system shall be complete with thermostatic expansion valves at the evaporator coils.

3. Thermometers: Fabricated refrigerated compartments to be fitted with either flush dial or digital thermometers as specified on individual items. Thermometers shall be adjustable and calibrated after installation. Accuracy to be +/- 2 degrees Fahrenheit.

4. Hardware: Refrigerator hardware for fabricated refrigerator compartments shall be heavy-duty components, NSF Listed. Self closing, Heavy Duty edge mount style hinges, C.H.G. R42 Series with Spring Kit or equal. Latches to be magnetic edge mount type, C.H.G. #R25-1700-C with cylinder locks, or equal unless specified or detailed otherwise. All doors and drawers for walk-in coolers/freezers, and reach-in refrigerated compartments, both fabricated and standard, shall be fitted with cylinder locks, and provided with master keys.

C. Cold Pans:

1. Ice pans, refrigerated pans and cabinets shall be provided with breaker strips or other insulation where adjoining top or cabinet face materials, to prevent transfer of cold and possible condensation problems.

2. All open top mechanically cooled custom fabricated or standard buy-out refrigerators and/or cold pans shall comply with NSF Standard #7 requirements, as of April 1, 1998.

D. Refrigerated Equipment Ventilation:

1. Adequate ventilation shall be provided for custom fabricated equipment with integral refrigeration condensing units, both built-in and drop-in. If flow through ventilation cannot be provided, provide flow direction partitions and an additional fan capable of cooling the condensing unit.

2. If, in the opinion of the manufacturer, K.E.C. or his Refrigeration Subcontractor, additional room ventilation is required to ensure correct operating temperatures of standard buy-out, custom fabricated, or remote refrigeration condensing units, or compressor rack assemblies, they shall so state in a letter to the Architect and Foodservice Consultant, for evaluation and decision.

2.6 MILLWORK STANDARDS:

A. Unless otherwise indicated, framing and blocking to be of kiln-dried pine, assembled with bolted (or screwed) and glued connections. All butt joints are to be flush, smooth, and joined with waterproof glue. Any screws in face materials will be countersunk and holes filled and smoothed. Top and vertical panels shall be constructed of 3/4" thick close grained plywood, Grade AA/B or better, of selected, smooth, sanded stock; “OSB”, “MDF” or particle board panels are not acceptable. Millwork manufacturer shall be approved by the Architect and/or Foodservice Consultant.

2.7 MISCELLANEOUS:

A. Nameplates. Whenever possible, locate nameplates and labels on manufactured items, in accessible position, but not within normal view of customers.

B. Manufactured Equipment Items: Furnish items as scheduled or herein specified. Verify dimensions, spaces, rough-in and service requirements, and electrical characteristics, before ordering. Provide trim, accessories and miscellaneous items for complete installation.

C. Insert Pans: Cut-outs, openings, drawers, or equipment specified or detailed to hold stainless steel insert pans shall be provided with a full complement of pans as per specifications. Pans to be stainless steel, 20-gauge minimum, solid insert pan, depth as indicated, unless otherwise specified.

D. Tray Slides: Before fabrication of counters with tray slides, verify size and shape of tray to be used. Edge of tray shall not overhang outer support/slider by more than 2”. If edge of tray exceeds this dimension, notify Architect, in writing, for evaluation and adjustment, if necessary. Tray slide to be capable of supporting 200 pounds per linear foot, live load.

E. Self-leveling dispensers: Verify type and make of customer smallwares (plates, cups, bowls, etc.) to be used in each unit, and supply this information to the respective manufacturer, for proper sizing and calibration of mechanisms.

F. Reasonable quietness of operation of equipment is a expected, and the Foodservice Contractor will be required to replace or repair any equipment producing excessive noise at no expense to the owner. This includes, but is not limited to bumpers and gaskets for doors and drawers on fabricated and standard manufactured items, and sound deadening or insulation where specified and practical. Carbon Dioxide (CO2) Equipment: Where equipment requires connection with compressed CO2 cylinder for operations, provide 2-cylinder manifold and control system integral with equipment, with proper connections for Department of Transportation (DOT) approved type cylinders, complete with necessary safety devices.

PART 3 - EXECUTION

3.1 SUPERVISION:

A. A competent supervisor or foreman, representing the K.E.C., shall be present at all times during progress of the Contractor's work.

3.2 SITE EXAMINATION:

A. K.E.C. shall verify site conditions under the provisions of the General Conditions, Supplementary Conditions and applicable provisions of Division 1 Sections. Notify the Architect and Foodservice Consultant, in writing, of unsatisfactory conditions for proper installation of foodservice equipment specified in this section.

B. K.E.C. shall verify wall, column, door, window, and ceiling locations and dimensions. Fabrication and installation should not proceed until dimensions and conditions have been verified and coordinated with fabrication details.

C. K.E.C. shall verify that necessary wall reinforcement or backing has been provided for wall mounted equipment. Coordinate with General Contractor for placement of such backing during wall construction.

D. General Contractor shall verify that ventilation ducts are of the correct characteristics, and in the required locations.

E. K.E.C. shall verify with project electrical, mechanical and plumbing subcontractors that all required service utilities are available, of the correct characteristics, and in the required locations. Notify the Architect and Foodservice Consultant in writing of any problems or conflicts with foodservice equipment specified in this section.

3.3 INSTALLATION:

A. K.E.C. shall sequence and coordinate with General Contractor the installation and erection of all foodservice equipment items to ensure correct mechanical and electrical utility connections are achieved. Install items as per each manufacturers installation manual.

B. K.E.C. shall set each item of non-mobile and non-portable equipment securely in place, leveled and adjusted to correct height. K.E.C. shall anchor all equipment where indicated, and where required for sustained operation and use without unnecessary movement. Conceal anchors wherever possible. Adjust counter tops and other work surfaces to a level tolerance of (+/-) 1/16” or better.

C. K.E.C. shall provide any anchors, supports, bracing, clips, attachments, etc., as required to comply with the local seismic restraint requirements if applicable. The Guidelines For Seismic Restraint Of Kitchen Equipment, as prepared for the Sheet Metal Industry Fund of Los Angeles and endorsed by S.M.A.C.N.A., should be followed.

D. K.E.C. shall complete field assembly joints in all equipment by welding, bolting/gasketing, or as otherwise indicated and specified. Grind all welds smooth and restore finish to match surrounding materials as specified.

E. K.E.C. shall provide sealants and gaskets around each unit to make joints airtight, waterproof, vermin-proof, and sanitary for cleaning purposes. At internal corner joints, apply sealant or gaskets to form a sanitary cove. Shape exposed surfaces of sealant slightly concave. Sealant filled or gasketed joints will be acceptable up to 3/8” joint width. Wider joints are to be provided with a matching metal closure or trim strip, with sealant application each side of strip.

F. K.E.C. shall insulate contact points between dissimilar metals to prevent electrolysis. K.E.C. shall cut, punch and drill components for outlets, fixtures, piping, conduit, and fittings as required. K.E.C. shall verify and coordinate with other trades, and provide holes in food service equipment for plumbing and electrical service to and through the fixtures, as required or indicated. This includes welded sleeves, collars, ferrules, or escutcheons. These services are to be located so that they do not interfere with intended use and/or servicing of the fixture.

G. K.E.C. shall verify and coordinate mounting heights of all wall shelves and equipment, with equipment located below them, for proper clearances.

H. K.E.C. shall make all foodservice equipment items listed in Part 3.8 below ready for final connections to all building electrical, mechanical and plumbing services by respective trades.

3.4 ADJUSTING:

A. K.E.C. shall test and adjust equipment, controls and safety devices to ensure proper working order and conditions. Repair or replace equipment which is found to be defective in its operation.

3.5 CLEANING AND RESTORING FINISHES:

A. After completion of installation, and completion of other major work in foodservice areas, K.E.C. shall remove all protective coverings, films, etc., and clean foodservice equipment.

B. K.E.C. shall restore damaged finishes; polish exposed metal surfaces and touch-up painted surfaces. Replace work, which cannot be successfully restored. Clean and Polish glass, plastic, hardware and accessories, fixtures and fittings and leave in a condition ready for the Owner to sanitize and use.

3.6 EQUIPMENT START-UP & DEMONSTRATION:

A. K.E.C. shall make arrangements for demonstration of foodservice equipment operation and maintenance, in advance with the Owner/Operator by local Manufacturers Representatives. Demonstrate all equipment to familiarize the Owner and the Operator on operation and maintenance procedures, including periodic preventative maintenance measures required. Include an explanation of service requirements and simple on-site service procedures, as well as, information concerning the name, address and telephone number of qualified local source of service. The individual performing the demonstration shall be knowledgeable of operating and service aspects of the equipment.

3.7 SITE CLEANUP:

A. Throughout the progress of their work, K.E.C. shall keep their working area free from debris, and shall remove all trash, rubbish, etc., on a daily basis from. At no time is Contractor to allow any trash, debris, rubbish, crating, boxes, packaging, etc. to accumulate at the job site. At the completion of their work, the K.E.C. shall leave the premises in a clean and finished condition.

PART 4 - ITEMIZED EQUIPMENT SPECIFICATIONS

ITEM 1 - WALKIN COOLER-FREEZER (1 REQ'D)
AmeriKooler #25-02068 Custom Two Compartment Indoor Combo Cooler/Freezer.
Actual Overall Exterior Dimensions of 10'-10 3/4"W x 16'-4 1/2" L x 8'-7" High (Rectangular) as per project drawings.

Description:
All panel finishes as follows:
Exposed Exterior: 0.040" embossed white aluminum.
Unexposed Exterior: 26 ga. embossed acrylume.
Interior Walls: 0.040" embossed white aluminum.
Interior Ceiling: 0.040" embossed white aluminum.
All angle trim and top closure panels to match (0.040" white stucco aluminum).

Unit to be Floorless, with NSF vinyl screeds. Insulated slab by General Contractor.

Compartment #1 to be Indoor Freezer, Floorless, Interior Dimensions of 10'-2 3/4" x 8'-2" x 8'-3" (w x l x h) Temperature:-10°F (95°F ambient). Insulation: Panels of 4" thick AK-XPS4 extruded foam with R-values of R-29 for coolers and R-32 for freezers with a 50 Year Thermal Warranty. UL Classified Core Flame Spread 15, Smoke Rating less than 165. 15 Year Panel Warranty and 1 Year Parts Warranty.

Door: (1) 48" x 76" Right hinged flush door with brushed hardware. Interior & Exterior finish: .040 Embossed Aluminum, White. 36" kickplates to interior and exterior of door. Energy saving temperature regulating thermostat heater wire and heated relief vent. Heavy duty deadbolt handle latch with 1/4 turn inside release. Digital LED Thermometer with pilot light switch. 1807 11w, Vapor Proof, 120V. LED fixture. 82 Lumens /watt Angled face . Requires 115vac. 2.2 amps. With third door hinge.

Compartment #2 to be Indoor Cooler, Floorless, Interior Dimensions of 10'-2 3/4" x 7'-2 1/2" x 8'-3" (w x l x h). Temperature: 35°F (95°F ambient). Insulation: Panels of 4" thick AK-XPS4 extruded foam with R-values of R-29 for coolers and R-32 for freezers with a 50 Year Thermal Warranty. UL Classified Core Flame Spread 15, Smoke Rating less than 165. 15 Year Panel Warranty and 1 Year Parts Warranty.

Door: (1) 48" x 76" Right hinged flush door with brushed hardware. Interior & Exterior finish: .040 Embossed Aluminum. White. 35.875" kickplates to interior and exterior of door. Heavy duty deadbolt handle latch with 1/4 turn inside release. Digital LED Thermometer with pilot light switch. 1807 11w, Vapor Proof, 120V. LED fixture. 82 Lumens /watt Angled face . Requires 115vac. 1 amps. With third hinge.

Accessories to include (2) Kason #1809 compact LED lights (shipped loose, field installed) and 36” tall DATP wainscoting across exposed front exterior wall, (2) 3” x 3” angle trim closure strips for left and right sides of front wall in 0.040” white embossed aluminum to to match exterior and top closure panels to 10’ kitchen ceiling in 0.040” white embossed aluminum to to match exterior.

Refrigeration System Details for Freezer:
(1) 3 HP Bohn DOE Compliant Outdoor Condensing Unit, Model BCH0030LCBCZA0200, 208-230/3/60, MCA 28.8 Amps, Low Temperature, Scroll, Air-cooled, R-448A refrigerant, 1 year compressor and parts warranty from date of shipment within Continental USA. (9058 Btu/hr @ -10°F room temperature and 95°F ambient). Evaporator to be Bohn DOE Compliant Model BEL0080BS6EEAB0405, 208- 230/1/60, Low Profile Electric Defrost, 1 Fan Amps with Fixed Speed EC motor. To include (1) Extended 4 year compressor warranty and (1) Extended Warranty for 3 HP system 31st day thru 1st year, labor only.

Refrigeration System Details for Cooler:
(1) 0.75 HP Bohn DOE Compliant Outdoor Condensing Unit, Model BCH0008MCACZA0000, 208-230/3/60, MCA 15 Amps, BTUH 8300, Medium Temperature, Scroll, Air-cooled, R-448A refrigerant. Evaporator to be Bohn DOE Compliant Model BEL0060AS6AMAB0405, 115/1/60, Low Profile Air De-frost, 0.9 Fan Amps with 2 Speed EC motor. To include (1) Extended 4 year compressor Warranty and (1) Extended Warranty for 3/4 HP system 31st day thru 1st year, labor only

"Pre-Assembled Remote" refrigeration systems. All controls factory mounted. Refrigeration lines and refrigerant by others. Systems to use R448a and are to be supplied with winterization controls.

Refrigeration Accessories to include (2) Galvanized Weather Covers and (2) Steel Compressor Mounting Stands. Condensing units to be mounted on rooftop per architectural drawings.

All refrigeration units shall be quoted with full (1) year parts and labor warranty on all components, with the exception that said warranty will not cover normal routine maintenance and cleaning. Additionally, price shall include a (5) year parts only warranty on the compressors of both units.

Installation & Warranties:
Successful KEC shall be responsible for complete assembly of cabinet, complete installation of refrigeration system, startup and checking of unit(including any necessary adjustments), running of evaporate drain in hard copper tubing (PVC or PCVC is not acceptable), mounting of LED lighting to assembled cabinet interior ceiling where shown on drawings, and filing of all necessary permits and/or inspections, and coordination of necessary & required electrical wiring (including all control wiring) with electrical contractor. Unit shall be quoted with full (1) year parts and labor warranty on all components, with the exception that said warranty will not cover normal routine maintenance and cleaning. Additionally, price shall include a (5) year parts only warranty on the compressors of both units.

NOTES:

1. KEC refrigeration installers shall be responsible for coordination of necessary & required electrical wiring with electrical contractor on jobsite. All interior wiring by electrical contractor, using Anaconda "Seal-Tite" Type UA liquid tight flexible conduit with PVC jacket for all wiring; "EMT" conduit is NOT ACCEPTABLE inside of cabinet.

2. At every conduit penetration from exterior of box, electrical contractor must force foam sealant around the exterior of the electrical conduit and inside the conduit around the wires. Failure to eliminate airflow in the conduit will allow moisture from condensation to damage electrical components, especially lights and controls, which WILL NOT be covered under manufacturer warranty.

3. Refrigeration systems must be factory engineered and supplied by walkin cooler/freezer manufacturer. Use of alternate brands of refrigeration is NOT acceptable without prior approval. Refrigeration systems shall be piped to cabinets with hard copper Refrigeration tubing and fully insulated on pressure line side.

4. Refrigerants to be used must be R448A or other current EPA listed ”SNAP23” Regulation approved

refrigerants. Use of any delisted older refrigerants is not allowed.

5. KEC refrigeration installers shall be responsible to file any necessary permits and schedule any required mechanical inspections and supply signed/passed permit.

6. Condensate drain lines in coolers are to be insulated; additionally drain lines in freezers are to be heated with a low-wattage heater tape wrapped around the entire length of the drain line and then insulated to prevent drain line freezing.

7. Condensate Drain Lines must be terminated with a "P" or “S” trap at ends immediately above drain to prevent intrusion of outside humid air into cabinet which will cause ice buildup on evaporator coils.

Shop Drawings & Field Measurements:
Shop drawings for review and approval are required, consultant requests Cooler Manufacturer supply these drawings electronically via email as both PDF and AutoCAD “DWG” format files. (Drawing Exchange Format “DXF” files can be submitted if DWG format is not available). Shop drawings shall show all dimensions, materials, construction details, installation and relation to adjoining work or equipment requiring cutting or close fitting. Shop drawings shall also indicate any and all reinforcing, anchoring and related work required for the complete installation of these items. Before proceeding with the fabrication of any item, the KEC will field verify all necessary dimensions and details, with all job site dimensions and conditions considered.

REFRIGERATION SYSTEMS MUST BE ENGINEERED AND SUPPLIED FROM THE WALKIN VENDOR USED, SYSTEMS MUST NOT BE PROCURED THROUGH AN ALTERNATE CHANNEL TO ELIMINATE POSSIBLE WARRANTY ISSUES.

NOTE - KEC to be responsible for all field measurements and verification against shop drawings.

ITEM 2 - COOLER-FREEZER SHELVING (2 REQ'D)
Supply Cooler/Freezer Shelving As Follows:

Shelving Units:
Storage shelving units to be Camshelving® Premium Series Stationary Shelving Units. Stationary Starter Units with (5) Vented Shelves, 72” High each. Starter Units include (2) factory assembled post kits, (10) shelf traverses and shelf plates. Designed for use in high-volume operations with constant loading of heavy products and frequent daily deliveries. Withstands storage temperatures -36˚to 190F (-38˚to 88C). Impervious to moisture, chemicals, salt, food acids and humidity. Posts and traverses have a steel core and smooth polypropylene exterior for superior strength and durability. Traverse dovetails are molded into posts. Smooth polypropylene shelf plates contain Camguard, an antimicrobial technology that inhibits the growth of mold, fungus and bacteria that may cause odors, stains and product degradation. Weight bearing is uncompromised and space is maximized. No add-on clips or "S" hooks required. Posts and traverses wipe clean. Traverses and shelf plates remove easily for cleaning. Shelf traverses can be removed and adjusted at 4" increments. Sturdy reinforced nylon foot adjusts easily to level

units. Requires some assembly with minimal parts. Use a rubber mallet only. Lifetime warranty against rust and corrosion (posts, traverses and shelf plates). Color – Speckled Gray (480).

Dunnage Racks:
Dunnage Racks to be New Age “2000 Series” or approved equal with the following construction criteria:
All heli-arc welded aluminum construction. Framework is constructed of high tensile extruded primary aluminum tubing, Type 6063-T5 alloy, 1½” x 1¾”, with a minimum .070” wall thickness. Legs are permanently sealed with welded aluminum caps at bottoms – no open tubing spaces to allow collection of debris. Five-Year Guarantee against material defects and workmanship & Lifetime Guarantee against rust and corrosion. Minimum acceptable distributed weight capacity of 2000-lbs per unit. All sizes to be 8” tall above floor. 12” high units not acceptable. Sizes and quantities as listed below.

For Walkin Cooler, supply the following:
Shelving Units: (2) 21” x 42” and (2) 24” x 42” Units
For Walkin Freezer, supply the following:
Shelving Units: (2) 21” x 48” and (1) 24” x 42” Units
Dunnage Racks: (2) New Age #2027, 30" x 48", modify to 8" tall instead of the standard 12" height.

KEC to fully assemble and place units in locations shown on drawings; on shelving units bottom shelf to be 6” above floor, with upper shelves spaced per owner's request.

ITEM 3 - MOP SINK CABINET (1 REQ'D)
Advance Tabco Model 9-OPC-84DL
Cabinet with Mop Sink, 50-3/8"W x 22-3/4"D x 84"H O.A., double hinged doors, left side mop sink 20"W x 16"D front to back x 12" deep (drain included), storage for mop bucket to roll in on right, (2) mop holders, (4) fixed intermediate shelves (3 on right, 1 on left above sink), slotted side panels for ventilation, 16/304 series stainless steel sink bowl, 18/304 series sink bowl apron, 18/430 series stainless steel cabinet, NSF
Supply with the following options and accessories:
1 ea T&S Brass Model B-0665-BSTR Service Sink Faucet, 8" centers, 2-3/8" clearance from wall to center of faucet, 8-7/8" from wall to center of outlet, rough chrome-plated finish, vacuum breaker nozzle with 3/4" garden hose thread & pail hook, built in screwdriver stops
1 ea T&S Brass Model B-0654 Hose Bracket, 4-11/16"L x 2-5/8"W, stainless steel, with (1) spring-loaded rubber grip, includes: (2) mounting screws & (1) 30" rubber hose with plain end outlet & 3/4" female garden hose inlet

NOTE - KEC to supply, plumbing contractor to install.

ITEM 4 - SHELVING UNIT, PLASTIC WITH POLY EXTERIOR STEEL POSTS (1 REQ'D)
Cambro Model CPMU244875V4480
Camshelving® Premium Mobile Starter Unit, 24"W x 48"L x 75-1/4"H, 4-tier, withstands temperature -36°F (-38°C) to 190°F (88°C), includes: (4) vented polypropylene shelf plates with Camguard® antimicrobial protection, (2) pre-assembled post kits (posts constructed of steel with polypropylene exterior), (8)

traverses, molded-in dovetails, (2) sets of post connectors, (4) premium swivel casters with total locking brake, 900 lbs. max capacity, speckled gray, NSF

NOTE - K.E.C. to assemble where shown on project drawings, shelf spacing to be per owner's instructions, but bottom shelf must be minimum of 6” above floor to meet health department requirements for cleaning. Unit to consist of (4) shelves and (2) post sets with matching traverse sets.

ITEM 5 - HAND SINK (3 REQ'D)
Advance Tabco Model 7-PS-22
Hand Sink, wall mounted, 9" wide x 9" front-to-back x 5" deep bowl, 20 gauge 304 stainless steel, heavy duty deck mounted fixed faucet, drain with crumb basket & 1-1/2" IPS connection, NSF, cCSAus
Supply with the following options and accessories:
3 ea Model K-22OMIT To Delete Faucet
3 ea Model 7-PS-17A Welded Side Splash, 7-3/4"H (installed height), both sides, for hand sinks with 9" x 9" bowl, splash mounted faucets
3 st Model 7-PS-36 Side Mounted Wall Bracket (set of 2), for added strength
3 ea T&S Brass Model B-1141-2-V22-CR Workboard Mixing Faucet, deck mount, 4" centers, 4-3/8" swivel-rigid gooseneck nozzle with 2.2 GPM VR aerator, quarter-turn Cerama cartridges with check valves, lever handles with color-coded indexes, 1/2" NPT male inlets, low lead, cCSAus, ADA Compliant
3 ea T&S Brass 1 year limited warranty, standard
3 kt T&S Brass Model B-1100-KIT 24" Inlet Supply Hoses (3/8" Compression x 1/2" NPSM Female)

KEC to mount hand sinks to wall where shown and supply plumbing components to plumbing contractor for hookup. Neatly seal rear of splash to wall after installation with silver colored silicone. Soap & Towel Dispensers by Owner.

ITEM 6 - DISHTABLE SORTING SHELF (1 REQ'D)
Advance Tabco Model DT-6R-21
Sorting Shelf, wall mounted, tubular design, 22"W, accommodates (1) full size dish rack, solid end brackets, stainless steel, KD
Supply with the following options and accessories:
1 ea Model SMARTFAB SmartFab Options as Follows:
- Fully constructed of type 304 stainless steel, no use of 400-series stainless steel.
- Fully welded construction, "KD" or "knock down" construction not acceptable.

Shop Drawings for this item must be provided for review prior to fabrication.

KEC to mount unit to wall above sink where shown with stainless steel 1/4” lag screws.

Unit may be supplied from approved custom fabricators, or by Eagle Group, Aero Manufacturing, or John Boos, but must be built to above specifications.

ITEM 7 - DISHWASHER, UNDERCOUNTER (1 REQ'D)

Hobart Model LXNR-2
Advansys™ Dishwasher, undercounter with 17” door opening height, 120/208-240(3W)/60/1, accommodates optional two-level racking accessory, high temperature sanitizing, Steam elimination and Energy Recovery, 30, 24, 13 Racks/Hour, (48 racks / hour with second level rack), Fresh Water Rinse, .62 gal/rack, Complete Delime™ with Delime Notification, Auto Dispensing, and Booster Guard™, 3 selectable cycles - light, normal, heavy (Pot & Pan cycle on heavy cycle), smart touchscreen controls with Smart-Connect™ app, Service Diagnostics, Chemical Pumps with Auto Prime, 23-15/16"W x 26-13/16"D x 33-1/4"H, cULus, NSF, ENERGY STAR®. Factory Startup - Free for installations within 100 miles (accessible by public roadway) of a Hobart Service Office during normal business hours with appropriate notice; Installation beyond 100 miles or those not accessible by public roadway will be quoted by Service. Standard warranty - 1-Year parts, labor & travel time during normal working hours.
Supply with the following options and accessories:
1 ea Model TWOLEVELKIT-LX Two Level Racking Kit - Rack support, (1) 2nd level wire rack, (2) silverware baskets (only compatible with LXNR, LXNH, LXNC, LXER -H & -C models built after July 1, 2022)
1 ea Model DWT-ADV-LXN Drain water tempering kit for LXNR models
1 ea Model ACC-INSTALL-HOB Accessory Installation - For installations within 100 miles (accessible by public roadway) of a Hobart Service Office during normal business hours with appropriate notice; Installation beyond 100 miles locations in Alaska, Hawaii or New York City or those not accessible by public roadway will be quoted by Service. Includes installation of this item only, final electrical or plumbing connections by others. Recommendation: coordinate accessory installation with machine assembly/ installation (NET)
1 ea Model WTRHAM-ARREST Water Hammer Arrestor Kit - Includes 3/4" brass presure regulator valve

ITEM 8 - OVERSHELF (1 REQ'D)
New Age Model 1122PR
Shelf, with pot rack, wall-mounted, T-bar design, 48"W x 20"D, 600 lbs. shelf capacity, includes (7) pot hooks, aluminum construction, NSF , Made in USA.. Lifetime warranty against rust & corrosion, 5 year workmanship and material defects warranty, standard.

KEC to mount unit to wall above pot sink where shown with stainless steel 1/4” lag screws.

ITEM 9 - THREE (3) COMPARTMENT SINK (1 REQ'D)
Advance Tabco Model FC-3-2028-24RL
Fabricated Sink, 3-compartment, 24" right & left drainboards, bowl size 20" x 28" x 14" deep, 16 gauge 304 stainless steel, tile edge splash, rolled edge, 8" OC faucet holes, stainless steel legs with adjustable side cross-bracing, 1" adjustable stainless steel bullet feet, overall 34" F/B x 108" L/R, NSF
Supply with the following options and accessories:
1 ea Model K-495 Turn Down Backsplash (includes wall clips)
1 ft Model FC-CB-1 Front cross brace for FC, FS & FE series sink (minimum 3 feet, use overall length of sink & subtract drainboard length to get number of feet required) (Note-to field retrofit existing sink the sink will need to have plumbing disconnected to install cross brace)

1 ea T&S Brass Model B-0230-CR Sink Mixing Faucet, 18" swing nozzle, wall mounted, 8" centers on sink faucet, with 1/2" IPS eccentric flanged female inlets, lever handles, quarter-turn Cerama cartridges, low lead, ADA Compliant
1 ea T&S Brass Model B-TEE-EZK EasyInstall Tee Assembly, chrome-plated
1 kt T&S Brass Model B-0230-KIT Inlet Kit, 1/2" NPT nipple, close elbows, 24" flex supply hoses
3 ea T&S Brass Model B-3990-5X Modular Waste Drain Valve, with pull handle, 3-1/2" sink opening, 2" NPT female x 1-1/2" NPT male adapter, 5" handle extension

NOTE - KEC to anchor to wall with "Z"-clips. KEC to supply plumbing components, plumbing contractor to install. KEC to neatly seal backsplash and sides to wall after installation is complete with silver colored silicone.

ITEM 10 - 13' EXHAUST HOOD PACKAGE (1 REQ'D)
Accurex Model CUSTOM
13' Exhaust Hood Package as Follows:

Baffle Filter Canopy Hood:
Accurex Model XBEW-78-S (two 78" sections, 13' total)

Kitchen Ventilation hood(s) shall be of the Type I, exhaust only wall canopy suitable for all types of cooking applications. The hood(s) shall be U.L. 710 Listed without a fire damper (with optional) for 400°F, 600°F, or 700°F rated cooking appliances. Please visit www.ul.com for U.L. 710 listing for performance and size options. Make-up air shall be independently provided.

The hood(s) exterior shall be constructed of 300 series.The hood(s) shall be constructed using the standing seam method for optimum strength and with a Performance Enhancing Lip (PEL) to improve capture efficiency by turning air back into the hood. Front panels shall be of double wall construction with 1 inch insulation to add additional strength and rigidity. An integral 3 inch air space is provided to meet NFPA® 96 clearance requirements against limited combustible walls. Integral 3 inch air space may be omitted for non-combustible construction. All seams, joints and penetrations of the hood enclosure shall be welded and/or liquid tight. Lighter material gauges, alternate material types and finishes are not acceptable. All unexposed interior surfaces shall be constructed of a minimum 18 gauge corrosion resistant steel including, but not limited to ducts, plenum, and brackets.

The hood(s) shall include a filter housing constructed of the same material as the hood. The filters shall be stainless steel baffle type (non-stick coating optional), U.L. 1046 Classified, and in sufficient number and size to ensure optimum performance. The filter housing shall terminate in a pitched, full length grease trough which shall drain into a removable grease container. These filters shall have a grease removal efficiency of 28% at 8 microns (16% from 3-10 microns) and static pressure drop of 0.5-0.6 inWC. Vapor proof, U.L. Listed incandescent (recessed, fluorescent and LED optional, restrictions apply) light fixtures shall be pre-wired to a junction box located at the top of the hood for field connection. Wiring shall conform to the requirements of the NFPA® 70.

The canopy hood(s) shall be constructed by Accurex. They shall be built in accordance with the NFPA® 96, IMC, UMC, and bear the NSF Seal of Approval. The hood manufacturer shall provide, on request, the necessary data that confirms compliance with the code authorities listed above.

Hood Make Up Air Plenum:
Accurex Model ASP-Split Plenum (one 78" and one 90" section)

Air Curtain Supply Plenum (Front MUA Plenum)
The external air curtain, Accurex model ASP, shall be constructed with a minimum of 18 gauge 400 series stainless steel (300 series optional).Two layers of perforated panels will allow for well distributed low velocity airflow at discharge. Air curtain supply plenums are available in lengths from 3 feet to 16 feet; additional lengths will require hanging multiple plenums. The ASP shall be 14 inches wide by 10 inches high or 24 inches wide by 10 inches high and shall be mounted 14-20 inches above the bottom edge of the hood or flush with a drop ceiling; External air curtain supply plenums can supply airflow at a maximum rate of 180 cfm/ft. For optimum performance, design to the recommended rate of 110 cfm/ft for 14 inch wide plenums or 145 cfm/ft for 24 inch wide plenum.. In addition, external plenums can be attached to the face or ends of an exhaust only hood to create a curtain of air on all exposed sides of the hood, increasing the volume of air brought in at the hood.

Fire Suppression System:
Ansul R102 Fire Protection
Mounted in cabinet at left end of hood per project drawings.

The basic wet chemical fire suppression system includes the following:

- Pre-piping of the kitchen hood with schedule 40 black iron pipe and chrome appliance drops
- Fuel shut-off device:

A. Choice of a mechanical gas valve * up to 2 inches in diameter or
B. Choice of an electrical gas valve * up to 1 inch in diameter with a manual reset relay.
(The installation of the valve is the responsibility of the plumbing contractor)

- One double-pole, double throw microswitch is provided for use with electric appliances. This device can also be used with alarm systems, fan shut down, and electric gas solenoid valves. (The wiring of this device is the responsibility of the electrical contractor.)
- All detectors, links, release mechanism, tank and fire suppression agent.*
- One manual pull station for remote mounting. (this must be in the path of egress, at a maximum distance of 50 ft. from the release mechanism)
- An Ansul tank and release mechanism housed in a cabinet (for remote mounting only).
- Final field hook-up* to be performed by a non-union certified Ansul distributor.
- Greenheck Hood Mounted Fire Cabinet Hook-Up to consist of:
- Hook-up of detection lines, hook-up of supply lines, mount and hook-up of remote manual pull, hook-up of
- mechanical gas valve (if applicable), charge and tag system.
- Greenheck Remote Mounted Fire Cabinet Hook-Up to consist of:

• Hang automan and additional tanks if multiple system, hook-up of detection lines, hook-up of supply lines, mount and hook-up of remote manual pull, hook-up of mechanical gas valve (if applicable), charge and tag system.

• Factory coordination of final system hook-up between jobsite contact and the assigned Ansul distributor.

• One trip out to the jobsite is included.

• This program applies only to the continental United States. For an Ansul hook-up in Alaska, Hawaii, Canada, or any other remote location or international designation, please consult Greenheck for details and pricing.

• Permits and puff (air) test

*Items supplied by the assigned Ansul distributor

Exhaust Fan:
Roof Upblast, Direct Driven Fan
Accurex Model XCUE-160-VG

Provide Accurex Exhaust Fan Model XCUE as shown on plans and in accordance with the following specification:

Roof exhaust fans shall be upblast centrifugal direct drive type. The fan wheel shall be centrifugal backward inclined and shall include a wheel cone carefully matched to the inlet
cone for precise running tolerances. Wheels shall be statically and dynamically balanced. The fan housing shall be constructed of heave gauge aluminum with a rigid internal support structure. Wind bands shall have a rolled bead for added strength and shall be joined to curb caps with a leak proof, continuously welded seam. Motors shall be mounted out of the airstream on vibration isolators. Fresh air for motor cooling shall be drawn into the motor compartment from an area free of discharge contaminants. Motors shall be readily
accessible for maintenance. A disconnect switch shall be factory installed and wired from the fan motor to a junction box either within or outside of the motor compartment. A conduit chase shall be provided through the curb cap to the motor compartment for ease of electrical wiring for applications when national and local code restrictions allow.

All fans shall bear the AMCA Certified Ratings Seal for sound and air performance. Each fan shall bear a permanently affixed manufacturer's engraved metal nameplate containing the
model number and individual serial number for future identification. Fans shall be listed by Underwriters Laboratory for UL/cUL 762 or UL/cUL 705 where applicable.

Fans shall be Model XCUE as manufactured by Accurex.

Due to continuous research Accurex reserves the right to change specifications without notice.

Make-up Air Fan, Direct Drive, Untempered
Accurex Make-Up Air Model XKID-16-M2-VG

Make-up air unit shall be as manufactured by Accurex or approved equal provided all specifications are met. Performance to be as scheduled on plans.

Unit shall be of internal frame type construction of galvanized steel. All frames and panels shall be G90 galvanized steel. All metal-to-metal surfaces exposed to the weather shall be sealed, requiring no caulking at job site. All components shall be easily accessible through removable panels.

Centrifugal fans shall be double width, double inlet. Fan and motor shall be mounted on a common base and shall be internally isolated. All blower wheels shall be statically and dynamically balanced. Ground and polished steel fan shafts shall be mounted in permanently lubricated ball bearings. Bearings shall be selected for a minimum (L10) life in excess of 100,000 hours at maximum cataloged speeds.

Motors shall be energy efficient, complying with EPACT standards, for single speed ODP and TE enclosures. Motors shall be permanently lubricated, heavy duty type, matched to the fan load and furnished at the specified voltage, phase and enclosure. Drives shall be sized for a minimum of 150% of driven horsepower. Pulleys shall be cast and have machined surfaces. Units with motors of 10 HP and less shall be supplied with an adjustable drive pulley.

Filters shall be mounted in a straight or V-bank arrangement. Filters shall be UL Class 2, 2 inch aluminum mesh and easily removable.

Weatherhood shall be constructed of G90 galvanized steel and include 2 inch aluminum mesh filters at the intake.

Make-Up Air units shall be Model XKID as manufactured by Accurex.

Kitchen Fan Control Center
Accurex Model XKC-CV-S-11-2-1-0

Provide Accurex Kitchen Fan Control Center Model (XKC) as shown on plans and in accordance with the following specification:

The XFCC shall be constructed of 16 gauge 300 series stainless steel, and UL Listed to Standard 891. The pre-engineered control center shall include, but not be limited to, fan motor starters, light and fan switches, fire relay which controls both the supply and exhaust fan(s), quarter turn latch, color coded wiring with wiring diagram, grounding terminal blocks, and distribution terminal control strip for control wiring connection. All electrical components shall be UL listed or classified where applicable and wired in compliance with the National Electrical Code.

The control center and control switching have two typical mounting locations. 1) The panel will be remote mounted with the switches mounted on the panel face, or 2), utility cabinet mounted with the switches face mounted on the utility cabinet. Other options are available.

Three, standard overall dimensions for the control cabinets are 12 in. x 18 in. x 6 in., 18 in. x 18 in. x 6

in., and 25 in. x 18 in. x 6 in. Minimum control center dimensions are 12 in. x 18 in. x 6 in. for up to four fan motor starters. Minimum control center dimensions are 18 in. x 18 in. x 6 in. for up to eight fan motor starters. For single phase control panels, the maximum horsepower for 120V is 5 hp; the maximum horsepower for 208V is 10 hp; the maximum horsepower for 240V is 10 hp. For three phase control panels, the maximum horsepower for 208Vis 30 hp; the maximum horsepower for 480V is 50 hp, the maximum horsepower for 575V is 100 hp. Panel is available with mixed fan voltages and mixed phase. Each fan will receive its own, dedicated motor starter. Other options are available.

The control centers may be equipped with temperature interlock(s), which is compliant with International Mechanical Code (IMC) 2006 section 507.2.1.1. The temperature interlock(s) consist of either a thermostat style probe and off-delay time relay, or a temperature controller and resistive temperature detector (RTD). With both options the sensor/probe a junction box and fire proof/leak proof threaded fitting (Evergreen Quik-Seal® and/or Evergreen Compression Seal) will be provided. The interlock(s) shall power the fans when the sensor detects the temperature set point. The interlock(s) shall hold the circuit closed upon the fan switch being turned off until the temperature sensor detects a temperature below the set point.

If exhaust hood includes an automatic fire damper, damper switch will be mounted on hood front if control center is remote mounted. The damper switch will be mounted on front of utility cabinet if control panel is mounted in a utility cabinet.

The electrical contractor is to follow field-wiring requirements listed in the installation instructions. If the control center is mounted in the utility cabinet and the light and fan switches are mounted on the either the face of the hood or side of the utility cabinet, they will be factory wired. If there is a fire suppression system also mounted in the same utility cabinet, wiring to the micro switch is to be completed at the factory unless otherwise specified.

Temperature Interlock
International Mechanical Code (IMC) 2006 section 507.2.1.1 Compliant Electrical Package

Provide Accurex Temperature Interlock electrical package as shown on plans and in accordance with the following specification:

The Temperature Interlock(s) shall be U.L. 710 Listed and consist of a temperature controller, RTD, junction box, Evergreen threaded fitting, and shall be a self-contained unit or as part of another preengineered electrical control package. Hood systems should always be turned on manually before cooking equipment is turned on. The temperature interlock is intended as a backup system and the auto-on feature should only be utilized when the fans are forgotten to be turned on. The Temperature Interlock package shall close a relay powering the fans when the temperature set point is reached at the temperature sensor. The Interlock shall hold the circuit closed upon fan switch being turned off until the temperature at the sensor decreases below the set point plus hysteresis. Once the temperature is below the set point plus hysteresis, the fans shall shut down. In the event that the cooking equipment is started without the fans being manually turned on, the fans shall automatically activate and remain running with the presence of heat under the hood. The temperature controller shall open the relay after the temperature

at the temperature sensor in the exhaust duct or capture tank has dropped below the set point plus hysteresis. Once the temperature is below the set point plus hysteresis, the fans shall shut down.

KEC to supply entire hood package, including fans, electrical control package (kitchen fan control center) and Ansul system. KEC to hang hood, mechanical contractor to mount fans and fabricate/install all ducting (everything above top of hood). Electrical contractor to provide all electrical work. Ansul system full install is included with hood package, KEC to coordinate install with local authorized installers.

ITEM 11 - ELECTRIC FLOOR FRYER (2 REQ'D)
Imperial (Middleby) Model IFS-40-E
(QUICK SHIP) Fryer, electric, floor model, 40 lb. capacity, immersed electrical elements, snap action thermostat, includes: wire mesh crumb screen & (2) nickel-plated baskets, stainless steel front, door, sides, basket hanger & frypot, 6" legs, 14.0kW, cETLus, CSA-Sanitation, CE. Limited one year parts and labor warranty, standard.
Supply with the following options and accessories:
2 ea 208v/60/3-ph, 39.0 amps, 14.0 kW
2 ea Joiner strip, stainless steel
2 ea Swivel casters (set of 4) two with brakes, per set
2 pk Eagle Group Model CC-S-2 Caster Cradle® Caster Stabilizing Device, low-profile bowl-shape design, accommodates casters from 4" to 8" diameter, stainless steel, conforms to NFPA 17A 5.6.4, mounting hardware not included, NSF (pack of 2)
2 ea T&S Brass Model AG-RC Safe-T-Link Restraining Cable Kit, 60"L cable, includes: (1) u-bolt, (1) eye-bolt, (4) wall anchors with screws, (2) flat washers, (2) hex nuts, (1) wall bracket, (2) end clips
2 ea T&S Brass 5 year limited warranty, standard

KEC to install restraining cable and mount “Caster Cradle®“ wheel positioning devices to floor.

ITEM 12 - WORK TABLE, STAINLESS STEEL TOP (1 REQ'D)
Advance Tabco Model TFMS-153
Equipment Filler Table, 15"W x 36"D, 16 gauge 304 stainless steel top with 1-1/2"H rear up-turn, stainless steel legs & adjustable bullet feet, NSF (filler table needs to be placed between (2) other tables for stability)
Supply with the following options and accessories:
4 ea Model TA-19 Flanged Bullet Foot Insert, stainless steel (per foot) (fully collapsed it is 1-1/2” tall)
1 ea Model TA-23 Table legs welded to undershelf or cross rails, shipped set up and crated (per table) Top is not welded to legs (for fully welded table specify TA-23A)
1 ea Model TA-95 16 gauge 304 stainless steel leg upgrade (per table)

Shop Drawings for this item must be provided for review prior to fabrication.

Unit may be supplied from approved custom fabricators, or by Aero Manufacturing, Eagle Group, John Boos, but must be built to above specifications.

ITEM 13 - RANGE, 60", 6 BURNERS, 24" GRIDDLE (1 REQ'D)
Garland Model G60-6G24RR
G Starfire Pro Series Restaurant Range, gas, 60", (6) 33,000 BTU open burners, with cast iron top & ring grates, 24" x 23" x 5/8" thick smooth steel griddle plate, (2) standard ovens with 3 position rack guides with oven rack, stainless steel front, sides, plate rail, 2-piece back guard and shelf, 6" stainless steel legs with adjustable feet, 310,000 BTU, CSA Flame, CSA Star, cCSAus, NSF (Garland)
Supply with the following options and accessories:

1 ea	One year limited parts and labor warranty, covers products purchased and installed in the USA only, standard
1 ea	Natural gas, specify elevation if over 2,000 ft
2 ea	Thermostatically controlled griddle, add per thermostat, for each 12" section
1 ea	Griddle on right, standard
1 ea	Low-Profile stainless steel backguard, in lieu of standard backguard/shelf
1 ea	Model -CC Two Convection Ovens, in lieu of standard ovens, change suffix -RR to -CC (Full-Size Oven), for G Series
1 ea	(Two convection ovens) (2) 115v/60/1-ph, 3.4 amps, 6' cord & NEMA 5-15P, standard
1 ea	Adjustable height swivel casters with front brakes (set of 4)
1 kt	T&S Brass Model HG-2E-48SK Safe-T-Link Gas Connector Kit, 1" connection, 48" hose, stainless steel braiding with extruded coating, (2) Swivelink fittings, (1) 90° elbow, ball valve, necessary hardware, with Surelink restraining cable adjustable for 3' to 5', 443,000 BTU/ hr minium flow capacity
1 pk	Eagle Group Model CC-S-2 Caster Cradle® Caster Stabilizing Device, low-profile bowl-shape design, accommodates casters from 4" to 8" diameter, stainless steel, conforms to NFPA 17A 5.6.4, mounting hardware not included, NSF (pack of 2)

KEC to install restraining cable and mount “Caster Cradle®“ wheel positioning devices to floor.
Plumbing contractor to install gas hose and related components.

ITEM 14 - COMBI OVEN, ELECTRIC (1 REQ'D)
RATIONAL Model ICP 6-HALF ON 6-HALF E 208/240V 3 PH
Two (2) (CB1ERRA.0000212) iCombi Pro® 6-Half Size Combi Ovens, double stack, electric, (12) 13" x 18" sheet pan or (12) 12" x 20" steam pan or (12) 1/1 GN pan capacity, intelligent cooking system with (4) assistants; iDensityControl, iCookingSuite, iProductionManager, & iCareSystem, (6) operating modes, (5) cooking methods, (3) manual operating modes, 85° to 572°F temperature range, quick clean, care control, eco mode, 6-point core temperature probe, retractable hand shower, Ethernet interface, Wi-Fi enabled, 208/240v/60Hz/3-ph, 10.8 kW each, CE, IPX5, UL, cULus, NSF, ENERGY STAR®
Supply with the following options and accessories:

1 ea	Model 60.73.991 Stacking Kit for Combi-Duo, iCombi 6-half size (electric or gas) on iCombi 6- or 10-half size (electric only)
1 ea	Model 60.31.200 Stand I Stationary Oven Stand for Combi-Duo, 7-3/4"H, open sides, for iCombi 6-half size on 6-half size
1 ea	NOTE: All discounts subject to approval by manufacturer
1 ea	2 years parts and labor, 5 years steam generator warranty

1 ea Model CAP Chef Assistance Program, a RATIONAL certified Chef conducts 4 hours/location specialized application training with personnel, no charge
1 ea Model 9999.2002 Pre-Installation Site Consultation, provides an installation consultation to ensure the site has proper space and connections for gas, electric, drain & water, one (1) Consultation is needed for every four (4) cooking systems, includes 100 miles (200 miles round trip). (see attached installation flyer for details) THIS ITEM IS NON-DISCOUNTABLE, USA ONLY (NET)
2 ea Model 9999.2252 RCI RATIONAL Certified Installation, new certified installation for each table-top iCombi of a combi-duo, 100 miles (200 round-trip) included. (See attached installation flyer for details) THIS ITEM IS NON-DISCOUNTABLE, USA ONLY (NET)
2 ea Model 8720.1552US Installation Kit, for electric iCombi/SCC/CMP 61 (208/60Hz/3 & 240/60Hz/3); electric iCombi/SCC/CMP 101 (440/60Hz/3 & 480/60Hz/3); electric iCombi/SCC/CMP 62 (440/60Hz/3 & 480/60Hz/3) THIS ITEM IS NON-DISCOUNTABLE, USA ONLY (NET)
1 ea Model 1900.1159US Water Filtration Single Cartridge System, for any iVario, single Combi model, or XS or half-size Combi-Duos, includes: (1) single head with pressure gauge, R95-CLX filter & (1) filter installation kit
1 ea Model 9999.2271 RCI RATIONAL Certified Installation, additional installation cost for a RATIONAL Water Filter System is available when purchased with Certified Installation of RATIONAL unit THIS ITEM IS NON-DISCOUNTABLE, USA ONLY (NET)
1 ea Note: The RATIONAL Water Filtration Systems helps provide consistent high-quality water to your RATIONAL cooking systems. The patented carbon block technology reduces the effects of sediment, chloramines, and chlorine while delivering the required flow rates.
1 ea Model 56.00.562 Care Tabs, bucket of 150 packets for all iCombi Pro/Classic models and SelfCooking Center® units from 10/2008, with CareControl - Serial SG, SH or SI series (minimum order quantity: 2pcs, unless ordered with a unit) (NET)
4 ea Model 6019.1150 CombiFry Basket, 1/1 GN, 12-3/4" x 20-7/8"

ITEM 15 - WORK TABLE, STAINLESS STEEL TOP (1 REQ'D)
Advance Tabco Model SS-4812
Work Table, 144"W x 48"D, 14 gauge 304 stainless steel top, 18 gauge adjustable stainless steel under-shelf, stainless steel legs & adjustable bullet feet, NSF
Supply with the following options and accessories:
1 ea Model TA-22 Square edge table
2 ea Model TA-62D Electric outlet in doghouse box on top of table or overshelf, GFI, duplex, in 'doghouse-style' single gang box, NEMA 5-20R receptacles, stainless face plate, maximum 120v 20A service (wiring & utility chases or provisions not included) (optional chases and/or wiring by Advance Tabco is available-call for pricing)
1 ea Model TA-23A Table legs welded to leg gussets under table top and to undershelf or cross rails, shipped set up and crated (per table)
12 ft Model TA-94 16 gauge 304 stainless steel undershelf upgrade (per linear foot)
1 ea Model TA-95 16 gauge 304 stainless steel leg upgrade (per table)

Shop Drawings for this item must be provided for review prior to fabrication.

NOTE - Unit may be supplied from approved custom fabricators listed above, or by Eagle Group, John Boos, or Aero Manufacturing but must be built to above specifications.

ITEM 16 - S/S PREP TABLE (1 REQ'D)
Model CUSTOM
5' x 30" S/S Prep Table with Prep Sink. General construction as per sections 2.2-2.4 of 114000 Specifications. Top to be16-ga/type 304 stainless steel, fully welded/polished at all seams, with 1" x 5" rear & end splashes, "Z" clips at walls. Exposed right end splash to have fully enclosed rear. (1) 16" x 20” x 12" deep fully fabricated sink bowl (deep drawn or stamped sinks not acceptable) with AllPoints/FMP Model 102-1067 Spin & Seal Drain; top punched with 4” on center holes for deck mount T&S Brass faucet as noted below. Legs to be 16-ga/type 304 stainless steel, 1-5/8" O.D., fully welded/polished at all seam joints. Gussets to be C.H.G. #A18-0206-C; adjustable s/s bullet feet (C.H.G. #A10-0851-C). Fully welded 16-ga/304 stainless steel undershelf. Supply (1) NSF listed, heavy-duty 20” x 20” x 5” drawer assembly with cylinder locks (C.H.G. #S90-0020-C-N or equal) to right of sink, centered in open area between sink and right leg set.
Supply with the following options and accessories:
1 ea T&S Brass Model B-0225-61X-CCCR Double Pantry Faucet, deck mount, 4" OC, 10" swivel spout with stream regulator, lever handles, quarter-turn Cerama cartridges, 1/2" NPT male inlets, low lead, ADA Compliant
1 kt T&S Brass Model B-1100-KIT 24" Inlet Supply Hoses (3/8" Compression x 1/2" NPSM Female)
1 ea AllPoints Model 1021067 Spin & Seal Drain, 3-1/2" sink opening, 1-1/2" NPS outlet, 4-1/2"D top, stainless steel

Shop Drawings for this item must be provided for review prior to fabrication.

KEC to supply T&S components listed, plumbing contractor to install.

KEC to anchor flanged feet to floor with #12 S/S Phillips Head screws and expanding anchors

NOTE - Unit may be supplied from approved custom fabricators listed above, or by Eagle Group, John Boos, or Aero Manufacturing but must be built to above specifications.

ITEM 17 - OVERSHELF (1 REQ'D)
Advance Tabco Model PS-15-60
Shelf with Pot Rack, wall-mounted, 60"W x 15"D, 18/430 stainless steel shelf, 2" x 1/4" stainless steel pot rack, includes: (9) plated double pot hooks, NSF
Supply with the following options and accessories:
5 ft Model TA-99 16 gauge 304 stainless steel wall & overshelf upgrade, (per linear foot)
KEC to mount unit to wall above prep table as shown with stainless steel 1/4” lag screws.

Unit may be supplied from approved custom fabricators, or by Eagle Group, Aero Manufacturing, or John Boos, but must be built to above specifications.

ITEM 18 - SERVING COUNTER, COLD FOOD (1 REQ'D)
Vollrath Model 37066
4-Series Signature Server® Stainless Steel Countertop with NSF7 Cold Station, self contained refrigeration, 60"W x 28"D x 34"H, Bloomington-style recessed well displays pans 3" below work surface, coils surround sidewalls, accommodates 6" deep pans, polyurethane foam insulation, standard well drains, seamless display pan well opening 19-7/8" x 50-1/4" x 6-5/8" deep, 1/4 HP, 5.2amps, NEMA 5-15P, 120v/60/1-ph, cULus, NSF, Made in USA (Refer to vollrathfoodservice.com for full warranty policy). 1 year warranty against defects in materials & workmanship. 120v/60/1-ph.
Supply with the following options and accessories:
1 ea Model 36694 All Stainless finish for 4-Series Signature Server® with stainless steel countertops, 60"W models (Refer to vollrathfoodservice.com for full warranty policy)
1 ea Model SS-6BG-041S 6-Series Velocity Breath Guard, single-sided, adjustable, for 4-pan/well 4-series front-of-house serving system, 59"W x 3/8" thick tempered glass panels, 11 gauge stainless steel tubing, (8) pre-set positions, accommodates full-serve, self-serve, & horizontal position, push-button mechanism enables single-person adjustment, NSF, Made in USA (Refer to vollrathfoodservice.com for full warranty policy)
1 ea Model 9879304 Upgrade to 14 gauge stainless steel work surface for, 60"W 4-Series Signature Server® Cold Pan (required for this breath guard)
1 ea Model 98850 Work surface flange modified with line-up locks, Keyhole slots on diagonal corners with stainless slide attached to side of base (Refer to vollrathfoodservice.com for full warranty policy)
1 st Model SS4CASTERS 4-Series Signature Server® Swivel Casters, 4"H, (2) braked, standard

Shop Drawings for this item must be provided for review prior to fabrication.

ITEM 19 - HOT FOOD SERVING COUNTER / TABLE (1 REQ'D)
Vollrath Model 37040
4-Series Signature Server® Hot Food Serving Counter, 60"W x 28"D x 34"H, 18/300 stainless steel top with 1" turndown on all sides, (4) 12" x 20" x 6-3/8" deep wells with 625 watt elements, individual Touch-Temp® programmable controls, 18/400 series stainless steel unibody construction, manifold drains, pull-out ball valve drain, 2500 watts, cord, plug, cULus, NSF, Made in USA (Refer to vollrathfoodservice.com for full warranty policy). 1 year warranty against defects in materials & workmanship.
Supply with the following options and accessories:
1 ea 208v/60/1-ph
1 ea Model 36694 All Stainless finish for 4-Series Signature Server® with stainless steel countertops, 60"W models (Refer to vollrathfoodservice.com for full warranty policy)
1 ea Model SS-6BG-041S 6-Series Velocity Breath Guard, single-sided, adjustable, for 4-pan/well 4-series front-of-house serving system, 59"W x 3/8" thick tempered glass panels, 11 gauge stainless steel tubing, (8) pre-set positions, accommodates full-serve, self-serve, & horizontal position, push-button mechanism enables single-person adjustment, NSF, Made in USA (Refer to vollrathfoodservice.com for full warranty policy)
1 ea Model 9879204 Upgrade to 14 gauge stainless steel work surface for, (4) well 60"W 4-Series Signature Server® Hot Food Base (required for this breath guard)

1 ea Model 98850 Work surface flange modified with line-up locks, Keyhole slots on diagonal corners with stainless slide attached to side of base (Refer to vollrathfoodservice.com for full warranty policy)
1 st Model SS4CASTERS 4-Series Signature Server® Swivel Casters, 4"H, (2) braked, standard

Shop Drawings for this item must be provided for review prior to fabrication.

ITEM 20 - MOBILE HEATED CABINET (1 REQ'D)
FWE / Food Warming Equipment Co., Inc. Model PHTT-12
Quick Ship - Clymate IQ® Heated Cabinet, mobile, (12) pair universal tray slides, (12) 18" x 26" or (24) 12" x 20" tray capacity, 4-1/2" OC, adjustable to 1-1/2" increments, humidified holding system, individual heat & humidity controls, insulated, removable water reservoir, (2) Dutch doors, recessed hand grips, stainless steel interior & exterior, 5" casters (2) rigid & (2) swivel with brakes, cULus, UL EPH Classified, IPX4. Two year limited parts & one year labor warranty, standard. 120v/60/1-ph, 18.3 amps, 2192 watts, NEMA 5-20P, standard (US)
Supply with the following options and accessories:
1 ea Full Perimeter Bottom Bumper

ITEM 21 - REACH-IN REFRIGERATOR (1 REQ'D)
Traulsen Model G10010
Dealer's Choice Refrigerator, Reach-in, one-section, 23.4 cu. ft., self-contained refrigeration, (1) full height solid door (hinged right), (3) epoxy coated shelves (factory installed), microprocessor control with LED display, LED interior lights, stainless steel front, anodized aluminum sides & interior, 6" high casters, R290 Hydrocarbon refrigerant, 1/4 HP, 115v/60/1, 3.8 amps, NEMA 5-15P, cETLus, ETL-Sanitation, ENERGY STAR®. 6-year parts & labor and 7 year compressor, standard. Visit www.traulsen.com for details. Casters, 6"H, locking (set of 4), standard
Supply with the following options and accessories:
1 ea Model G1ACC-TK4 Set of (7) pairs universal tray slides, per full section, with pilasters, for single section G-series

ITEM 22 - REACH-IN FREEZER (1 REQ'D)
Traulsen Model G12010
Dealer's Choice Freezer, Reach-in, one-section, self-contained, microprocessor control with LED display, stainless steel front, full-height solid door, hinged right, anodized aluminum sides & interior, (3) epoxy coated shelves (factory installed), LED interior lights, 6" high casters, eco-friendly R290 Hydrocarbon refrigerant, unit can be programmed to operate at -10°F, 1/2 HP, 115v/60/1, 6.5 amps, NEMA 5-15P, cETLus, ETL-Sanitation. 6-year parts & labor and 7 year compressor, standard. Visit www.traulsen.com for details. Casters, 6"H, locking (set of 4), standard
Supply with the following options and accessories:
1 ea Model G1ACC-SHLF2 Set of 3 epoxy coated shelves with pilasters single section G-series models

ITEM 23 - ICE MAKER, CUBE-STYLE (1 REQ'D)
Manitowoc Model IDT0750A

Indigo NXT™ Series Ice Maker, cube-style, air-cooled, self-contained condenser, 30"W x 24"D x 21-1/2"H, production capacity up to 680 lb./24 hours at 70°/50° (540 lb. AHRI certified at 90°/70°), easy-Touch display with 13 different language options, date/time stamp display, automatic reminder/alert icon, one touch asset information, automatic detection of accessories, continuous operating status, programmable production options (time, weight, day or night), one touch cleaning with displayed instructions, Alpha-San anti-microbial protection, acoustical ice sensing probe, self-diagnostic technology, DuraTech™ exterior, dice size cubes, R410A refrigerant, NSF, cULus, CE, ENERGY STAR®. 3 year parts & labor (Machine), 5 year parts & labor (Evaporator), 5 year parts & 3 years labor (Compressor), standard
Supply with the following options and accessories:

1 ea (-261) 208-230v/60/1-ph, 11.1 amps
1 ea Model X Factory Built-In LuminIce II Virus & Bacteria Inhibitor, comes pre-installed in ice machine (Add "X" to end of Indigo model number)
1 ea Model WARRANTY-LUMINICE 3 year parts & labor warranty, standard
1 ea Model IAUCS iAuCS Automatic Cleaning System, accessory for Indigo NXT Cubers iF0300 - iT1900 & QuietQube models iF600C - iF2100C, external mounting, automatically schedules and performs routine de-scaling, assembly does not include cleaner or sanitizer, NSF, cULus (NOT for use with IB models)
1 ea Model WARRANTY-AUCS 3 year parts & labor warranty, standard
1 ea (-261) 208-230v/60/1-ph, 0.1 amps
1 ea Everpure Model EV932422 Insurice® Water Filtration System, Insurice® Twin PF-i2000², Twin, (1) EC210 Prefilter, (2) i2000²Micro-Pure® II Precoat primary filtration cartridge, reduces chlorine, taste & odor, inhibits scale, outlet pressure gauge, flushing valve, 18,000 gallons, 3.34 gpm, 0.5 micron, 3/4" inlet, 3/4" outlet, NSF 42 & 53 (EV932422)
1 ea Everpure This system requires (2) cartridges.
K.E.C. to set icemaker on bin and mount water filter to wall at 84" AFF where shown on plumbing drawings. Water and electrical hookup by other trades.

ITEM 24 - ICE BIN FOR ICE MACHINES (1 REQ'D)
Follett Products, LLC (Middleby) Model SG700S-30
Upright Ice Bin, single door, 680 lb. bin storage capacity, stainless exterior, poly liner, SmartGATE™ ice shield, poly door with PowerHinge, and corrosion-resistant ABS/poly top custom cut for ice machine, includes 82 oz. plastic ice scoop, NSF. 5 year parts & labor warranty, standard. NOTE: Purchase orders must clearly indicate the make & model of the ice machine(s) being used with the bin to properly prepare the bin top. Lack of this information will delay order processing
Supply with the following options and accessories:

1 ea Model ABICEPADDL46 Ice Paddle, high density poly, 46-1/2" long, for slope front bin, single door upright bin, and single door Ice DevIce ice storage and dispensing system
1 ea Model 00146365 Saf-T-Ice® Guardian Scoop System, 64 oz

ITEM 25 - FLOOR TROUGH (1 REQ'D)
IMC/Teddy Model SFT-1836-SG
SFT Shallow Floor Trough, 36"W x 18"D x 2" deep, 14/304 stainless steel, with drain & (SG) subway grating.

KEC to supply, installation by Plumbing Contractor.

END OF SECTION 114000

SECTION 12 2400

WINDOW SHADES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Manual roller shades and accessories.

B. Motorized roller shades and accessories.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Sequencing:

1. Do not fabricate shades until field dimensions for each opening have been taken with finished conditions in place. "Hold to" dimensions are not acceptable.
2. Do not install shades until final surface finishes and painting are complete.

B. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

1. Attendees shall include contractor, shade installer, manufacturer technical representative, and installers of adjacent materials and systems.
2. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.04 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product to be used including materials, finishes, fabrication details, dimensions, profiles, mounting requirements, and accessories.

C. Shop Drawings: Include shade schedule indicating size, location and keys to details.

1. Indicate blocking and metal support requirements including specific locations.

D. Source Quality Control Submittals: Provide test reports indicating compliance with specified fabric properties.

E. Samples for Verification: For each type of roller shade.

1. Shadeband Material: Not less than 6 inches square. Mark interior face of material if applicable.

a. Roller Shade: Full-size operating unit, not less than 16 inches wide by 36 inches long for each type of roller shade indicated.

b. Installation Accessories: Full-size unit, not less than 10 inches long.

F. Product Schedule: For roller shades. Use same designations indicated on Drawings.

G. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.05 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements.

C. Maintenance Data: Provide manufacturer parts lists, operation, and maintenance instructions for the materials of this Section.

D. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Roller Shades: Full-size units equal to 5 percent of quantity installed for each size, color, and shadeband material indicated, but no fewer than two units.

1.06 QUALITY ASSURANCE

A. Motorized Shades: Comply with NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section, with not less than ten years of documented experience.

C. Installer Qualifications: Company specializing in performing work of this type with minimum ten years of documented experience with shading systems of similar size, type, and complexity; and be a approved manufacturer's authorized representative.

1.07 MOCKUPS

A. Mockup: Provide a mockup for evaluation of installation, finishes, and workmanship.

1. Locate as directed by Architect.

2. Size: Minimum one fabricated unit of each type in configuration directed by Architect.

3. Do not proceed with installation beyond mockup until the mockup installation is approved by Architect. Correct deficiencies and refinish mock-up area as required to produce acceptable work.

B. Subject to compliance with requirements, approved mockups may become part of the completed Work if accepted to remain by Architect and if undisturbed at time of Substantial Completion.

C. Approval of mockups does not constitute approval of deviations from the Contract Documents unless Architect specifically approves such deviations in writing.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver shades in manufacturer's unopened packaging, labeled to identify each shade for each opening.

B. Handle and store shades in accordance with manufacturer's recommendations.

1.09 FIELD CONDITIONS

A. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.10 WARRANTY

A. Special Manufacturer Warranty: Provide manufacturer's standard, non-depreciating warranty, for interior shading only, covering the following:

1. Roller Shade Hardware and Chain Warranty: Manufacturer's standard non-depreciating limited warranty.
    a. Defects in materials, workmanship or failure to operate for as long as the original retail purchaser owns the product or as indicated for items below.
    b. All internal mechanisms.
    c. Components and brackets.
2. Shadecloth: Manufacturer's standard warranty.
    a. Fabric delamination.
3. Shade Motors and Motor Control Systems: Manufacturer's standard non-depreciating five year warranty.

B. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this section.

1. Warranty Period: One year from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 PRODUCTS, GENERAL

A. Requirements of this Section are based on proprietary manufacturer specifications. Final selections shall be by Architect from manufacturer full range of options and configurations, and shall comply with Owner requirements.

2.02 MANUFACTURERS

A. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.03 MANUFACTURERS

A. Basis of Design: Products by MechoShade Systems LLC. www.mechoshade.com.

1. Selections: Provide in configuration selected by Architect from manufacturer full range.
2. Drawing Designation: WND-1.
3. Drawing Designation: WND-2.

2.04 SHADEBAND MATERIALS

A. Shadeband Material Flame-Resistance Rating: Comply with applicable codes and regulations. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.05 ROLLER SHADE FABRICATION

A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.

B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F:

1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch per side or 1/2-inch total, plus or minus 1/8 inch. Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch, plus or minus 1/8 inch.

C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible, except as follows:

1. Vertical Shades: Where width-to-length ratio of shadeband is equal to or greater than 1:4, provide battens and seams at uniform spacings along shadeband length to ensure shadeband tracking and alignment through its full range of movement without distortion of the material.
2. Railroaded Materials: Railroad material where material roll width is less than the required width of shadeband and where indicated. Provide battens and seams as required by railroaded material to produce shadebands with full roll-width panel(s) plus, if required, one partial roll-width panel located at top of shadeband.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine finished openings for deficiencies that may preclude satisfactory installation.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 PREPARATION

A. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under the project conditions.

B. Coordinate with window installation and placement of concealed blocking metal support fabrications to support shades.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions and approved shop drawings, using mounting devices as indicated.

B. Replace shades that exceed specified dimensional tolerances at no extra cost to Owner.

C. Adjust level, projection, and shade centering from mounting bracket. Verify there is no telescoping of shade fabric. Ensure smooth shade operation.

3.04 SYSTEM STARTUP

A. Motorized Shade System: Provide services of a manufacturer's authorized representative to perform system startup.

3.05 CLEANING

A. Clean soiled shades and exposed components as recommended by manufacturer.

B. Replace shades that cannot be cleaned to new condition.

3.06 CLOSEOUT ACTIVITIES

A. Demonstration: Demonstrate operation and maintenance of window shade system to Owner's personnel.

B. Training: Train Owner's personnel on operation and maintenance of system.

1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
2. Provide minimum of two hours training by manufacturer's authorized personnel at location designated by the Owner.

3.07 PROTECTION

A. Protect installed products from subsequent construction operations.

B. Touch-up, repair or replace damaged products before Substantial Completion.

3.08 MAINTENANCE

A. Provide to Owner a separate renewable maintenance contract for the service and maintenance of a motorized shade system for one year from Date of Substantial Completion. Include a complete description of preventive maintenance, systematic examination, adjustment, parts and labor, cleaning, and testing, with a detailed schedule.

END OF SECTION

SECTION 12 3600

COUNTERTOPS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Countertops for architectural cabinet work.

1.03 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation.

B. Attendees shall include contractor, countertops installer, manufacturer technical representative, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.04 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Manufacturer's data sheets on each product to be used.

1. Specimen warranty.

C. Shop Drawings: Complete details of materials and installation .

1. Provide coordination data with architectural cabinet work specified in other section including dimensions, and mounting criteria.
2. Indicate location of seams and joints.

D. Verification Samples: For each finish product specified, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.

E. Qualifications Statement: Indicating compliance with quality assurance requirements.

1. Quartz installer
2. Quartz fabricator
3. Quartz manufacturer.
4. Solid surface countertop installer.
5. Solid surface countertop fabricator.

6. Solid surface countertop manufacturer.

1.05 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements.

C. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Minimum of five years documented installation experience for projects similar in scope and complexity to this Project, and currently certified by the manufacturer and/or fabricator as an acceptable installer.

B. Quartz Manufacturer Qualifications: Provide materials by manufacturer with minimum 10 years experience manufacturing the products of this section. Quartz surfacing materials shall be produced in an ISO 9001 certified facility.

C. Quartz Fabricator Qualifications: Minimum of five years documented experience in fabricating quartz surfacing countertops similar in scope and complexity to this Project, using water-cooled cutting tools. Currently certified by the manufacturer as an acceptable fabricator.

D. Solid Surface Countertop Manufacturer Qualifications: Provide materials by manufacturer with minimum 10 years experience manufacturing the products of this section. Surfacing materials shall be produced in an ISO 9001 certified facility.

E. Solid Surface Countertop Fabricator Qualifications: Minimum of five years documented experience in fabricating countertops similar in scope and complexity to this Project, using water-cooled cutting tools. Currently certified by the manufacturer as an acceptable fabricator.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Comply with manufacturer's recommendations for shipping and handling quartz surfacing materials to preclude breakage and damage. Brace quartz surfacing units as necessary during shipment, transporting in near-vertical position with finished face towards finished face. Do not allow finished surfaces to rub during shipping and handling.

C. Store materials protected from exposure to harmful weather conditions, at temperature and humidity conditions recommended by the manufacturer. Store surfacing materials on racks in near-vertical position to preclude damage. Store with finished face turned towards finished face. Prevent warpage and breakage.

1.08 FIELD CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer and fabricator for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

B. Adhesives: Acclimate adhesives to occupancy room temperatures with maximum temperature not to exceed 75 deg F (24 deg C).

C. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

D. Coordinate locations of utilities that will penetrate countertops or backsplashes.

E. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

1.09 WARRANTY

A. Special Installer Warranty: Standard Installers warranty covering defects resulting from materials and workmanship for the Work of this section.

1. Warranty Period: One year from date of Substantial Completion.

B. Special Quartz Countertop Manufacturer's Limited Warranty: Provide manufacturer standard Commercial and Residential Limited Warranty against defects in quartz surfacing sheet materials for product selected.

C. Special Solid Surface Manufacturer Warranty: Provide manufacturer’s standard warranty for material only for period of 10 years against defects and/or deficiencies. Manufacturer shall correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Architect and at no expense to Owner.

PART 2 PRODUCTS

2.01 SOLID SURFACING COUNTERTOPS

A. Basis of Design: As indicated on Finish Legend on Drawings.

1. Drawing Designation: SS-2.
2. Drawing Designation: SS-3.

B. Material: A solid, nonporous, integral color homogeneous surfacing of 100% acrylic resin and natural minerals.

C. Solid Material Thickness:

1. Countertops: 3/4-inch (19mm).
2. Face Edge: Same thickness as countertop unless otherwise indicated on Drawings.
3. Backsplash: 3/4-inch (19mm).

4. Edge Profile: As indicated on Drawings. Coordinate with project Interior Design requirements.

D. Fabricate tops as large single pieces as possible with shop-applied backsplashes and edges, unless otherwise indicated.

E. Cutouts and Holes:

1. Undercounter (Undermount) Fixtures: Make cutouts for undercounter fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves and polish exposed edges to match countertop finish.

2. Counter-Mounted Fixtures: Prepare countertops in shop for field cutting opening for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.

3. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.

2.02 QUARTZ COUNTERTOPS

A. Basis of Design: As indicated on Drawings.

1. Drawing Designation: SS-1.

B. Material: Homogeneous mixture containing approximately 93% pure quartz with additions of high performance polyester resin, pigments and special effects.

C. Countertops:

1. Thickness: 3 cm.

2. Edge Profile: Pencil edge at top and bottom of all exposed edges.

D. Splashes: Provide backsplashes and end splashes, unless otherwise indicated.

1. Thickness: 3 cm.

2. Height: Varies. Refer to architectural Drawings.

3. Exposed Edge Profile: Pencil edge at top and bottom of all exposed edges.

E. Cutouts and Holes:

1. Undercounter (“Undermount”) Fixtures: Make cutouts for undercounter fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves and polish exposed edges to match countertop finish.

2. Counter-Mounted Fixtures: Prepare countertops in shop for field cutting opening for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.

3. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.

2.03 ACCESSORY MATERIALS

A. Countertop Support Brackets:

1. Basis of Design: Products by Rakks by Rangine Corporation. www.rakks.com
    a. Surface or inside wall mount counter support bracket as indicated on Drawings.
    b. Minimum 2x2x.25 inch T-extrusion, minimum 300 pound weight capacity.
    c. Material: Aluminum.
2. Permanently Exposed Locations - Factory Finish: Primed for field painting as specified in Section 09 9000.
3. Permanently Concealed Locations - Factory Finish: As selected by Architect from manufacturer standard range.

B. Countertop Support Brackets - Curved:

1. Basis of Design: Supports by A&M Hardware. www.aandmhardware.com
2. Acceptable Manufacturers: Subject to compliance with requirements.
    a. A&M Hardware. www.aandmhardware.com
    b. Federal Brace. www.federalbrace.com
    c. Iron Supports. www.ironsupports.com
3. Factory prefabricated countertop support bracket with curved gusset designed for wall supported countertop overhangs or "floating" countertops.
    a. ADA compliant.
    b. Load limit range of 1520 lbs to 2900 lbs per pair.
    c. Material and Finish: 1/8-inch steel, factory finished primed with flat black paint.
4. Size: Provide size recommended by manufacturer for countertop depth. Minimum 24 by 24 inches.
5. Permanently Exposed Finish Color: Manufacturer standard factory applied black final finish.

C. Plywood for Supporting Substrate: Marine grade plywood or 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch (19 mm) thick; join lengths using metal splines. Coordinate with the requirements of Section 06 1053 - Miscellaneous Rough Carpentry.

D. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.

1. Basis of Design: Adhesive: Countertop manufacturer's recommended silicone-based construction adhesive for backsplashes, endsplashes, and other applications according to manufacturer's published fabrication instructions.

E. Joint Sealant: Mildew-resistant silicone sealant, color to be selected by Architect.

1. Use non-staining sealant in accordance with countertop material manufacturer requirements.

2. Use sealant provided by countertop manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

C. Examine substrates to receive countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops. Substrates must be sound, flat, smooth, and free from dust or other surface contaminants. Verify substrates are within manufacturer required flatness tolerances.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Seal joint between back/end splashes and vertical surfaces.

B. Install surfacing components plumb, level, and true according to approved shop drawings and manufacturer's published installation instructions. Use woodworking and specialized fabrication tools acceptable to the manufacturer.

1. Install over solid wood substrate.
2. Fasten surfacing components to base cabinets or other supporting substrates with suitable adhesives acceptable to manufacturer.
3. Bookmatch material unless indicated otherwise.

C. Form joint seams with specified seam adhesive. Seams to be inconspicuous in completed work. Seams in locations shown on approved shop drawings and acceptable to manufacturer. Promptly remove excess adhesive.

1. Clamp or brace surfaces in position until adhesive sets.

D. Fill gaps between countertop and terminating substrates with specified sealant.

E. Install backsplashes and endsplashes where indicated on Drawings. Adhere to countertops with specified construction adhesive.

F. Install penetrating sealer on natural stone fabrications in accordance with manufacturer instructions and as recommended by fabricator/manufacturer.

3.04 TOLERANCES

A. Variation From Horizontal: 1/8 inch in 10 feet (3 mm in 3 m), maximum.

B. Offset From Wall, Countertops: 1/8 inch (3 mm) maximum; 1/16 inch (1.5 mm) minimum.

3.05 REPAIRS

A. If permissible to Architect, minor surface marring for surfacing components may be repaired according to manufacturer's published installation instructions.

B. Remove and replace surfacing components that are damaged and cannot be satisfactorily repaired.

3.06 CLEANING AND PROTECTION

A. Clean countertops surfaces thoroughly.

B. Clean surfacing components according to manufacturer's published maintenance instructions.

C. Completely remove excess adhesives and sealants from finished surfaces.

D. Protect completed work from damage during remainder of construction period.

E. Touch-up, repair or replace damaged products before date of Substantial Completion.

END OF SECTION

SECTION 12 3664

SOLID SURFACE SILLS, STOOLS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Solid surface material interior window sills/stools.

1.03 REFERENCE STANDARDS

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; Current Edition.

B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; Current Edition.

C. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.1; Current Edition.

D. PS 1 - Structural Plywood; Current Edition.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation to discuss conformance with project requirements, manufacturer installation requirements, affected adjacent materials and system, and site conditions.

B. Attendees shall include contractor, sill/stool installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

B. Product Data: For sill/stool materials.

1. Provide product description, fabrication requirements, and compliance with specified performance requirements.

C. Test and Evaluation Reports: Submit flammability test reports.

D. Shop Drawings: For sills/stools. Show materials, finishes, edge and sill/stool profiles, methods of joining, blocking requirements, fastening requirements, coordination requirements for adjacent work, and cutouts. Where seams are required at installed areas provide minimum 3 inch equals one foot drawings indicating seam locations.

E. Samples: For each type of material exposed to view. Minimum 6 by 6 inch size. Cut sample and seam together for representation of inconspicuous seam. Indicate full range of color and pattern variation.

1.06 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements. Warranty shall be completed in Owner's name and registered with manufacturer.

C. Maintenance Data: Provide manufacturer maintenance instructions for the materials of this Section.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: Provide materials by manufacturer with minimum 10 years experience manufacturing the products of this section.

B. Installer Qualifications: Work of this section shall be completed by installers with minimum 5 years experience in the application of products, systems and assemblies specified and with approval and training of the product manufacturer.

1.08 MOCKUPS

A. Mockup: Provide a mockup for evaluation of installation, finishes, and workmanship.

1. Locate as directed by Architect.
2. Size: Minimum one fabricated unit in configuration directed by Architect.

B. Do not proceed with installation beyond mockup until the mockup installation is approved by Architect. Correct deficiencies and refinish mock-up area as required to produce acceptable work.

C. Subject to compliance with requirements, approved mockups may become part of the completed Work if accepted to remain by Architect and if undisturbed at time of Substantial Completion. Remove mockup when directed by Architect.

D. Approval of mockups does not constitute approval of deviations from the Contract Documents unless Architect specifically approves such deviations in writing.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

C. Comply with manufacturer's recommendations for shipping and handling quartz surfacing materials to preclude breakage and damage. Brace quartz surfacing units as necessary during shipment, transporting in near-vertical position with finished face towards finished face. Do not allow finished surfaces to rub during shipping and handling.

D. Store materials protected from exposure to harmful weather conditions, at temperature and humidity conditions recommended by the manufacturer. Store quartz surfacing sheet materials on racks in near-vertical position to preclude damage. Store with finished face turned towards finished face. Prevent warpage and breakage.

1.10 FIELD CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

B. Adhesives: Acclimate adhesives to occupancy room temperatures with maximum temperature not to exceed 75 deg F (24 deg C).

C. Field Measurements: Verify dimensions of sill/stool by field measurements.

D. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

1.11 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this section.

1. Warranty Period: One year from date of Substantial Completion.

B. Special Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, where items fail to perform as designed and manufactured.

1. Manufacturer shall replace materials showing defects or deficiencies which become apparent within warranty period at no expense to Owner.
2. Warranty Period: Ten years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 SOLID SURFACE MATERIALS

A. Basis of Design: As indicated on Drawings.

1. Drawing Designation: SS-3.

B. Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.

1. 100% Acrylic, non-porous, homogeneous material maintaining the same composition throughout the part with a composition of acrylic polymer, aluminum trihydrate filler and pigment; not coated, laminated or of composite construction.
2. Flammability: Class 1 and A when tested to UL 723.

C. Thickness: 1/2 inch minimum.

2.02 MATERIALS - GENERAL

A. Plywood for Supporting Substrate: 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch (19 mm) thick; join lengths using metal splines.

B. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.

1. Basis of Design: Adhesive: Countertop manufacturer's recommended silicone-based construction adhesive for backsplashes, endsplashes, and other applications according to manufacturer's published fabrication instructions.

C. Joint Sealant: Mildew-resistant silicone sealant, color to be selected by Architect.

1. Use non-staining sealant in accordance with sill/stool material manufacturer requirements.
2. Use sealant provided by sill/stool manufacturer.

2.03 SOLID SURFACE FABRICATION

A. Fabricate according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards.".

1. Grade: Custom.

B. Sill/Stool Fabrication:

1. Fabricate components in shop to greatest extent practical to sizes and shapes indicated, in accordance with approved shop drawings and solid polymer manufacturer requirements.
2. Cut components larger than finished dimensions and sand edges to remove nicks and scratches.
3. Joints: Fabricate without joints.
4. Rout and finish component edges to a smooth, uniform finish. Rout cutouts, then sand edges smooth. Repair or reject defective or inaccurate work.

C. Fabrication Tolerances:

1. Variation in Component Size: +/-1/8-inch.
2. Location of Openings: +/-1/8-inch from indicated location.

D. Configuration:

1. Exposed edges: Straight, slightly eased.

2. Non-Exposed Edges: Factory standard square edge.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of Conditions:

1. Examine substrates and conditions, with fabricator present for compliance with requirements for installation tolerances and other conditions affecting performance of work. Proceed with installation only after unsatisfactory conditions have been corrected.
2. Verify actual site dimensions and location of adjacent materials prior to commencing work.
3. Examine substrates upon which materials are to be installed. Verify substrates are level.
4. Notify Architect in writing of any conditions which would be detrimental to installation.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 INSTALLATION

A. Install surfacing components plumb, level, and true according to approved shop drawings and manufacturer's published installation instructions. Use woodworking and specialized fabrication tools acceptable to the manufacturer.

1. Install sill/stool over solid wood substrate.
2. Fasten surfacing components with suitable adhesives and fasteners as recommended by manufacturer.

B. Form joint seams with specified seam adhesive. Seams to be inconspicuous in completed work. Seams in locations shown on approved shop drawings and acceptable to manufacturer. Promptly remove excess adhesive.

1. Clamp or brace surfaces in position until adhesive sets.

C. Apply sealant to gaps at walls; comply with Section 07 9200 - Joint Sealants.

D. Fill gaps between sill/stool and terminating substrates with specified sealant.

E. Clean and protect in accordance with manufacturer instructions.

3.03 REPAIR

A. If permissible to Architect, repair minor imperfections and cracked seams and replace areas of severely damaged surfaces in accordance with manufacturer’s instructions.

3.04 SITE QUALITY CONTROL

A. Non-Conforming Work: Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Architect at no cost to Owner.

3.05 CLEANING AND PROTECTION

A. Remove excess adhesive and sealant from visible surfaces.

B. Clean surfaces in accordance with manufacturer's "Care and Maintenance Instructions".

C. Provide protective coverings to prevent physical damage or staining following installation for duration of Project.

D. Protect surfaces from damage until date of Substantial Completion of the Work.

END OF SECTION

SECTION 12 9313

BICYCLE RACKS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Commercial bike racks at exterior locations.

1.03 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation to discuss conformance with project requirements, manufacturer installation requirements, affected adjacent materials and system, and site conditions.

B. Attendees shall include contractor, bike rack installer, and installers of affected adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 3000 - Administrative Requirements.

B. Product Data: Manufacturer's data sheets on each product to be used, including full range of standard color selections.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed installation of bicycle racks similar in material, design, and extent to that indicated for this project and whose work has resulted in construction with a record of successful in-service performance.

B. Manufacturer Qualifications: Minimum five years experience in producing bicycle racks of the types specified. Manufacturer shall be experienced in manufacturing bicycle racks similar to those required for this project and with a record of successful in-service performance.

C. Source Limitations: Obtain each color, finish, shape and type of bicycle rack from a single source with resources to provide components of consistent quality in appearance and physical properties.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer’s unopened packaging until ready to install.

B. Handle parts with sufficient care to prevent scratches and other damage to the finish.

C. Materials delivered to the site shall be examined for concealed damage or defects in shipping. Defects shall be noted and reported to the Owner's Representative in writing.

1.07 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.08 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this section.

1. Warranty Period: One year from date of Substantial Completion.

B. Special Manufacturer Warranty: Provide manufacturer's warranty covering manufacturing and material defects, where items fail to perform as designed and manufactured.

1. Warranty Period: Provide manufacturer standard warranty.

PART 2 PRODUCTS

2.01 GENERAL

A. Accessibility: Products shall comply with applicable codes, standards, and regulations including the Americans with Disabilities Act (ADA). Requirements apply to installation locations and heights as well as products.

2.02 BICYCLE RACKS, HORIZONTAL SURFACES, INTERIOR OR EXTERIOR

A. Basis of Design - Base Bid: Products by AAA Ribbon Bike Rack Company, a Brandir International Inc. company.

1. Selection: Ribbon Bike Rack.

a. Configuration: 63 inch long, 7 bike capacity.

2. Acceptable Manufacturers: Subject to compliance with specified requirements.

a. AAA Ribbon Bike Rack Company, a Brandir International Inc. www.ribbonrack.com.

b. Dero Bike Rack Company, www.dero.com.

c. Huntco Site Furnishings, www.huntco.com.

3. Characteristics:

a. Materials: ASTM A312 Schedule 40, Type 304 or 316 stainless steel

b. Mounting: Surface mount with anchors embedded in concrete.

c. Fabrication: Hydraulic bending with a mandril. Press bending fabrication or other methods resulting in flattened outer curves and crimped inner curves is not acceptable.

d. Finish: Satin #4 stainless steel finish.

2.03 ACCESSORIES

A. Provide accessories as recommended by product manufacturer for complete installation.

B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

1. For use as a separator between dissimilar metals and for metal in contact with, or embedded in concrete.

2. Apply in two coats to achieve 30 dry mil thickness.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates upon which bicycle racks will be installed. Verify that surfaces are clean, flat and level within manufacturer's recommended installation tolerances.

B. If preparation is the responsibility of another installer, notify Architect of deviations from manufacturer's recommended installation tolerances and conditions.

C. Do not proceed with installation until substrates have been properly prepared and deviations are corrected.

D. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 INSTALLATION

A. Install bicycle racks in accordance with manufacturer's installation instructions.

B. Install bicycle racks level, plumb, square, accurately aligned, correctly located per drawings, and without warp.

C. Where metal is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or installing nonconductive spacers.

D. Where metal is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

E. Mounting: Hardware and fasteners in accordance with manufacturer's instructions. Securement assembly shall be embedded in concrete to resist minimum 400 lbs of force.

F. Mounting: In accordance with manufacturers recommendations. Refer to Drawings for additional requirements.

3.03 ADJUSTING

A. Adjust for smooth and efficient operation.

3.04 CLEANING

A. Wash and clean in accordance with manufacturer recommendations prior to date of Substantial Completion.

3.05 PROTECTION

A. Protect installed items through date of Substantial Completion.

B. Clean, repair, or replace items to as new condition to the Architect's satisfaction.

END OF SECTION

SECTION 22 0513

COMMON MOTOR REQUIREMENTS FOR PLUMBING EQUIPMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General Conditions and other Division 1 Specification Sections, apply to the Work of this Section.

1.02 SUMMARY

A. Section includes general requirements for single-phase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on ac power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

1.03 COORDINATION

A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:

1. Motor controllers.
2. Torque, speed, and horsepower requirements of the load.
3. Ratings and characteristics of supply circuit and required control sequence.
4. Ambient and environmental conditions of installation location.

PART 2 - PRODUCTS

2.01 GENERAL MOTOR REQUIREMENTS

A. Comply with NEMA MG 1 unless otherwise indicated.

2.02 MOTOR CHARACTERISTICS

A. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet (1000 m) above sea level.

B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

2.03 POLYPHASE MOTORS

A. Description: NEMA MG 1, Design B, medium induction motor.

B. Efficiency: Energy efficient, as defined in NEMA MG 1.

C. Service Factor: 1.15.

D. Rotor: Random-wound, squirrel cage.

E. Bearings: Regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading.

F. Temperature Rise: Match insulation rating.

G. Insulation: Class F.

H. Code Letter Designation:

1. Motors 15 HP and Larger: NEMA starting Code F or Code G.
2. Motors Smaller than 15 HP: Manufacturer's standard starting characteristic.

I. Enclosure Material: Cast iron for motor frame sizes 324T and larger; rolled steel for motor frame sizes smaller than 324T.

2.04 SINGLE-PHASE MOTORS

A. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:

1. Permanent-split capacitor.
2. Split phase.
3. Capacitor start, inductor run.
4. Capacitor start, capacitor run.

B. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.

C. Motors 1/20 HP and Smaller: Shaded-pole type.

D. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

PART 3 - EXECUTION – NOT USED.

END OF SECTION

SECTION 22 0517

SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General Conditions and other Division 1 Specification Sections, apply to the Work of this Section.

1.02 SUMMARY

A. Section Includes:

1. Sleeves.
2. Sleeve-seal systems.
3. Grout.

1.03 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.01 SLEEVES

A. Cast-Iron Wall Pipes: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.

B. Galvanized-Steel Wall Pipes: ASTM A 53/A 53M, Schedule 40, with plain ends and welded steel collar; zinc coated.

C. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, with plain ends.

D. Galvanized-Steel-Sheet Sleeves: 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint.

E. Molded-PE or -PP Sleeves: Removable, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.

2.02 SLEEVE-SEAL SYSTEMS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Advance Products & Systems, Inc.
2. CALPICO, Inc.
3. Metraflex Company (The).
4. Pipeline Seal and Insulator, Inc.
5. Proco Products, Inc.

B. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.

1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Pressure Plates: Stainless steel.
3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.03 GROUT

A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

B. Characteristics: Nonshrink; recommended for interior and exterior applications.

C. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.01 SLEEVE INSTALLATION

A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.

B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch (25-mm) annular clear space between piping and concrete slabs and walls.

1. Sleeves are not required for core-drilled holes.

C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.

1. Permanent sleeves are not required for holes in slabs formed by molded-PE or -PP sleeves.
2. Cut sleeves to length for mounting flush with both surfaces.
    a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches (50 mm) above finished floor level.
3. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.

D. Install sleeves for pipes passing through interior partitions.

1. Cut sleeves to length for mounting flush with both surfaces.

2. Install sleeves that are large enough to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pipe or pipe insulation.

3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint. Comply with requirements for sealants specified in Division 7 joint sealants section.

E. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Division 07 firestopping section.

3.02 STACK-SLEEVE-FITTING INSTALLATION

A. Fire-Barrier Penetrations: Maintain indicated fire rating of floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Division 07 firestopping section.

3.03 SLEEVE-SEAL-SYSTEM INSTALLATION

A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.

B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.04 SLEEVE AND SLEEVE-SEAL SCHEDULE

A. Use sleeves and sleeve seals for the following piping-penetration applications:

1. Exterior Concrete Walls above Grade:

a. Piping Smaller Than NPS 6 (DN 150): Cast-iron wall sleeves or Galvanized-steel wall sleeves.

b. Piping NPS 6 (DN 150) and Larger: Cast-iron wall sleeves or Galvanized-steel wall sleeves.

2. Exterior Concrete Walls below Grade:

a. Piping Smaller Than NPS 6 (DN 150): Cast-iron wall sleeves with sleeve-seal system or Galvanized-steel wall sleeves with sleeve-seal system.

1) Select sleeve size to allow for 1-inch (25-mm) annular clear space between piping and sleeve for installing sleeve-seal system.

b. Piping NPS 6 (DN 150) and Larger: Cast-iron wall sleeves with sleeve-seal system or Galvanized-steel wall sleeves with sleeve-seal system.

1) Select sleeve size to allow for 1-inch (25-mm) annular clear space between piping and sleeve for installing sleeve-seal system.

3. Concrete Slabs-on-Grade:
   a. Piping Smaller Than NPS 6 (DN 150): Cast-iron wall sleeves with sleeve-seal system or Galvanized-steel wall sleeves with sleeve-seal system.
      1) Select sleeve size to allow for 1-inch (25-mm) annular clear space between piping and sleeve for installing sleeve-seal system.
   b. Piping NPS 6 (DN 150) and Larger: Cast-iron wall sleeves with sleeve-seal system or Galvanized-steel wall sleeves with sleeve-seal system.
      1) Select sleeve size to allow for 1-inch (25-mm) annular clear space between piping and sleeve for installing sleeve-seal system.
4. Concrete Slabs above Grade:
   a. Piping Smaller Than NPS 6 (DN 150): Galvanized-steel-pipe sleeves, Stack-sleeve fittings or Molded-PE or -PP Sleeves.
   b. Piping NPS 6 (DN 150) and Larger: Galvanized-steel-pipe sleeves.
5. Interior Partitions:
   a. Piping Smaller Than NPS 6 (DN 150): Galvanized-steel-pipe sleeves.
   b. Piping NPS 6 (DN 150) and Larger: Galvanized-steel-sheet sleeves.

END OF SECTION

SECTION 22 0518
ESCUTCHEONS FOR PLUMBING PIPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General Conditions and other Division 1 Specification Sections, apply to the Work of this Section.

1.02 SUMMARY

A. Section Includes:

1. Escutcheons.
2. Floor plates.

1.03 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.01 ESCUTCHEONS

A. One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.

B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with chrome-plated finish and spring-clip fasteners.

C. One-Piece, Stamped-Steel Type: With chrome-plated finish and spring-clip fasteners.

D. Split-Casting Brass Type: With polished, chrome-plated and rough-brass finish and with concealed hinge and setscrew.

E. Split-Plate, Stamped-Steel Type: With chrome-plated finish, concealed and exposed-rivet hinge, and spring-clip fasteners.

2.02 FLOOR PLATES

A. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.

B. Split-Casting Floor Plates: Cast brass with concealed hinge.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.

B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of insulated piping and with OD that completely covers opening.

1. Escutcheons for New Piping:

a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.

b. Chrome-Plated Piping: One-piece, cast-brass type with polished, chrome-plated finish.

c. Insulated Piping: One-piece, stamped-steel type.

d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.

e. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.

f. Bare Piping in Unfinished Service Spaces: One-piece, stamped-steel type.

g. Bare Piping in Equipment Rooms: One-piece, stamped-steel type.

2. Escutcheons for Existing Piping:

a. Chrome-Plated Piping: Split-casting brass type with polished, chrome-plated finish.

b. Insulated Piping: Split-plate, stamped-steel type with concealed hinge.

c. Bare Piping at Wall and Floor Penetrations in Finished Spaces: Split-casting brass type with polished, chrome-plated finish.

d. Bare Piping at Ceiling Penetrations in Finished Spaces: Split-casting brass type with polished, chrome-plated finish.

e. Bare Piping in Unfinished Service Spaces: Split-plate, stamped-steel type with exposed-rivet hinge.

f. Bare Piping in Equipment Rooms: Split-plate, stamped-steel type with exposed-rivet hinge.

C. Install floor plates for piping penetrations of equipment-room floors.

D. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.

1. New Piping: One-piece, floor-plate type.

2. Existing Piping: Split-casting, floor-plate type.

3.02 FIELD QUALITY CONTROL

A. Replace broken and damaged escutcheons and floor plates using new materials.

END OF SECTION

SECTION 22 0519

METERS AND GAGES FOR PLUMBING PIPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General Conditions and other Division 1 Specification Sections, apply to the Work of this Section.

1.02 SUMMARY

A. Section Includes:
   1. Liquid-in-glass thermometers.
   2. Thermowells.
   3. Dial-type pressure gages.
   4. Gage attachments.
   5. Test plugs.

B. Related Sections:
   1. Section 22 11 16 "Domestic Water Piping" for water meters inside the building.

1.03 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.04 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For meters and gages to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.01 LIQUID-IN-GLASS THERMOMETERS

A. Metal-Case, Industrial-Style, Liquid-in-Glass Thermometers:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following may be incorporated into the Work include, but are not limited to, the following:
      a. Flo Fab Inc.
      b. Miljoco Corporation.

c. Palmer Wahl Instrumentation Group.

d. Tel-Tru Manufacturing Company.

e. Trerice, H. O. Co.

f. Weiss Instruments, Inc.

g. Winters Instruments - U. S.

2. Standard: ASME B40.200.

3. Case: Cast aluminum 9-inch (229-mm) nominal size unless otherwise indicated.

4. Case Form: Adjustable angle unless otherwise indicated.

5. Tube: Glass with magnifying lens and red organic liquid.

6. Tube Background: Nonreflective aluminum with permanently etched scale markings graduated in deg F (deg C).

7. Window: Glass.

8. Stem: Aluminum and length to suit installation.

a. Design for Thermowell Installation: Bare stem.

9. Connector: 1-1/4 inches (32 mm), with ASME B1.1 screw threads.

10. Accuracy: Plus, or minus 1 percent of scale range or one scale division, to a maximum of 1.5 percent of scale range.

2.02 THERMOWELLS

A. Thermowells:

1. Standard: ASME B40.200.

2. Description: Pressure-tight, socket-type fitting made for insertion into piping tee fitting.

3. Material for Use with Copper Tubing: CNR or CUNI.

4. Material for Use with Steel Piping: CRES.

5. Type: Stepped shank unless straight or tapered shank is indicated.

6. External Threads: NPS 1/2, NPS 3/4, or NPS 1, (DN 15, DN 20, or NPS 25,) ASME B1.20.1 pipe threads.

7. Internal Threads: 1/2, 3/4, and 1 inch (13, 19, and 25 mm), with ASME B1.1 screw threads.

8. Bore: Diameter required to match thermometer bulb or stem.

9. Insertion Length: Length required to match thermometer bulb or stem.

10. Lagging Extension: Include on thermowells for insulated piping and tubing.

11. Bushings: For converting size of thermowell's internal screw thread to size of thermometer connection.

B. Heat-Transfer Medium: Mixture of graphite and glycerin.

2.03 PRESSURE GAGES

A. Direct-Mounted, Metal-Case, Dial-Type Pressure Gages:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. AMETEK, Inc.; U.S. Gauge.
    b. Ashcroft Inc.
    c. Ernst Flow Industries.
    d. Flo Fab Inc.
    e. Marsh Bellofram.
    f. Miljoco Corporation.
    g. Noshok.
    h. Palmer Wahl Instrumentation Group.
    i. REOTEMP Instrument Corporation.
    j. Tel-Tru Manufacturing Company.
    k. Trerice, H. O. Co.
    l. Watts Regulator Co.; a div. of Watts Water Technologies, Inc.
    m. Weiss Instruments, Inc.
    n. WIKA Instrument Corporation - USA.
    o. Winters Instruments - U. S.
2. Standard: ASME B40.100.
3. Case: Liquid-filled, Solid-front, pressure relief type(s); cast aluminum or drawn steel; 4-1/2-inch (114-mm) nominal diameter.
4. Pressure-Element Assembly: Bourdon tube unless otherwise indicated.
5. Pressure Connection: Brass, with NPS 1/4 or NPS 1/2 (DN 8 or DN 15), ASME B1.20.1 pipe threads and bottom-outlet type unless back-outlet type is indicated.
6. Movement: Mechanical, with link to pressure element and connection to pointer.
7. Dial: Nonreflective aluminum with permanently etched scale markings graduated in psi (kPa).
8. Pointer: Dark-colored metal.
9. Window: Glass.
10. Ring: Metal.
11. Accuracy: Grade A, plus or minus 1 percent of middle half of scale range.

2.04 GAGE ATTACHMENTS

A. Snubbers: ASME B40.100, brass; with NPS 1/4 or NPS 1/2 (DN 8 or DN 15), ASME B1.20.1 pipe threads and piston-type surge-dampening device. Include extension for use on insulated piping.

B. Valves: Brass or stainless-steel needle, with NPS 1/4 or NPS 1/2 (DN 8 or DN 15) ASME B1.20.1 pipe threads.

2.05 TEST PLUGS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Flow Design, Inc.
2. Miljoco Corporation.
3. National Meter, Inc.
4. Peterson Equipment Co., Inc.
5. Sisco Manufacturing Company, Inc.
6. Trerice, H. O. Co.
7. Watts Regulator Co.; a div. of Watts Water Technologies, Inc.
8. Weiss Instruments, Inc.

B. Description: Test-station fitting made for insertion into piping tee fitting.

C. Body: Brass or stainless steel with core inserts and gasketed and threaded cap. Include extended stem on units to be installed in insulated piping.

D. Thread Size: NPS 1/4 (DN 8) or NPS 1/2 (DN 15), ASME B1.20.1 pipe thread.

E. Minimum Pressure and Temperature Rating: 500 psig at 200 deg F (3450 kPa at 93 deg C).

F. Core Inserts: Chlorosulfonated polyethylene synthetic and EPDM self-sealing rubber.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install thermowells with socket extending a minimum of 2 inches (51 mm) into fluid and in vertical position in piping tees.

B. Install thermowells of sizes required to match thermometer connectors. Include bushings if required to match sizes.

C. Install thermowells with extension on insulated piping.

D. Fill thermowells with heat-transfer medium.

E. Install direct-mounted thermometers in thermowells and adjust vertical and tilted positions.

F. Install direct-mounted pressure gages in piping tees with pressure gage located on pipe at the most readable position.

G. Install valve and snubber in piping for each pressure gage for fluids.

H. Install test plugs in piping tees.

I. Install thermometers in the following locations:

1. Inlet and outlet of each water heater.
2. Inlets and outlets of each domestic water heat exchanger.
3. Inlet and outlet of each domestic hot-water storage tank.

J. Install pressure gages in the following locations:

1. Building water service entrance into building.
2. Inlet and outlet of each pressure-reducing valve.
3. Suction and discharge of each domestic water pump.

3.02 CONNECTIONS

A. Install meters and gages adjacent to machines and equipment to allow service and maintenance of meters, gages, machines, and equipment.

3.03 ADJUSTING

A. Adjust faces of meters and gages to proper angle for best visibility.

3.04 THERMOMETER SCALE-RANGE SCHEDULE

A. Scale Range for Domestic Cold-Water Piping: 0 to 100 deg F (Minus 20 to plus 50 deg C).

B. Scale Range for Domestic Hot-Water Piping: 0 to 250 deg F (0 to 150 deg C).

3.05 PRESSURE-GAGE SCALE-RANGE SCHEDULE

A. Scale Range for Water Service Piping: 0 to 100 psi (0 to 600 kPa).

B. Scale Range for Domestic Water Piping: 0 to 100 psi (0 to 600 kPa).

END OF SECTION

SECTION 22 0523

GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General Conditions and other Division 1 Specification Sections, apply to the Work of this Section.

1.02 SUMMARY

A. Section Includes:

1. Brass ball valves.
2. Bronze ball valves.
3. Bronze swing check valves.
4. Iron swing check valves.
5. Iron, grooved-end swing check valves.
6. Iron gate valves.

B. Related Sections:

1. Section 22 05 53 "Identification for Plumbing Piping and Equipment" for valve tags and schedules.
2. Section 22 11 16 "Domestic Water Piping" for valves applicable only to this piping.
3. Section 22 13 19 "Sanitary Waste Piping Specialties" for valves applicable only to this piping.

1.03 DEFINITIONS

A. CWP: Cold working pressure.

B. EPDM: Ethylene propylene copolymer rubber.

C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.

D. NRS: Nonrising stem.

E. OS&Y: Outside screw and yoke.

F. RS: Rising stem.

G. SWP: Steam working pressure.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of valve indicated.

1.05 QUALITY ASSURANCE

A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.

B. ASME Compliance:

1. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
2. ASME B31.1 for power piping valves.
3. ASME B31.9 for building services piping valves.

C. NSF Compliance: NSF 61 for valve materials for potable-water service.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion.
2. Protect threads, flange faces, grooves, and weld ends.
3. Set angle, gate, and globe valves closed to prevent rattling.
4. Set ball and plug valves open to minimize exposure of functional surfaces.
5. Set butterfly valves closed or slightly open.
6. Block check valves in either closed or open position.

B. Use the following precautions during storage:

1. Maintain valve end protection.
2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS FOR VALVES

A. Refer to valve schedule articles for applications of valves.

B. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

C. Valve Sizes: Same as upstream piping unless otherwise indicated.

D. Valve Actuator Types:

1. Gear Actuator: For quarter-turn valves NPS 8 (DN 200) and larger.
2. Handwheel: For valves, other than quarter-turn types.
3. Handlever: For quarter-turn valves NPS 6 (DN 150) and smaller except plug valves.

E. Valves in Insulated Piping: With 2-inch (50-mm) stem extensions and the following features:
1. Gate Valves: With rising stem.
2. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
3. Butterfly Valves: With extended neck.

F. Valve-End Connections:
1. Flanged: With flanges, according to ASME B16.1 for iron valves.
2. Grooved: With grooves, according to AWWA C606.
3. Solder Joint: With sockets, according to ASME B16.18.
4. Threaded: With threads, according to ASME B1.20.1.

G. Valve Bypass and Drain Connections: MSS SP-45.

2.02 BRASS BALL VALVES

A. Two-Piece, Full-Port, Brass Ball Valves with Stainless-Steel Trim:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Conbraco Industries, Inc.; Apollo Valves.
b. Jamesbury; a subsidiary of Metso Automation.
c. NIBCO INC.
d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
2. Description:
a. Standard: MSS SP-110.
b. SWP Rating: 150 psig (1035 kPa).
c. CWP Rating: 600 psig (4140 kPa).
d. Body Design: Two piece.
e. Body Material: Forged brass.
f. Ends: Threaded.
g. Seats: PTFE or TFE.
h. Stem: Stainless steel.
i. Ball: Stainless steel.
j. Port: Full.

2.03 BRONZE BALL VALVES

A. Two-Piece, Full-Port, Bronze Ball Valves with Stainless-Steel Trim:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Conbraco Industries, Inc.; Apollo Valves.
   b. Jamesbury; a subsidiary of Metso Automation.
   c. NIBCO INC.
   d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
2. Description:
   a. Standard: MSS SP-110.
   b. SWP Rating: 150 psig (1035 kPa).
   c. CWP Rating: 600 psig (4140 kPa).
   d. Body Design: Two piece.
   e. Body Material: Bronze.
   f. Ends: Threaded.
   g. Seats: PTFE or TFE.
   h. Stem: Stainless steel.
   i. Ball: Stainless steel.
   j. Port: Full.

2.04 BRONZE SWING CHECK VALVES

A. Class 125, Bronze Swing Check Valves with Nonmetallic Disc:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. NIBCO INC.
   b. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
2. Description:
   a. Standard: MSS SP-80, Type 4.
   b. CWP Rating: 200 psig (1380 kPa).
   c. Body Design: Horizontal flow.
   d. Body Material: ASTM B 62, bronze.
   e. Ends: Threaded.
   f. Disc: PTFE or TFE.

2.05 IRON SWING CHECK VALVES

A. Class 125, Iron Swing Check Valves with Nonmetallic-to-Metal Seats:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. NIBCO INC.
    b. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
2. Description:
    a. Standard: MSS SP-71, Type I.
    b. CWP Rating: 200 psig (1380 kPa).
    c. Body Design: Clear or full waterway.
    d. Body Material: ASTM A 126, gray iron with bolted bonnet.
    e. Ends: Flanged.
    f. Trim: Composition.
    g. Seat Ring: Bronze.
    h. Disc Holder: Bronze.
    i. Disc: PTFE or TFE.
    j. Gasket: Asbestos free.

2.06 IRON, GROOVED-END SWING CHECK VALVES

A. 300 CWP, Iron, Grooved-End Swing Check Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. NIBCO INC.
    b. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
2. Description:
    a. CWP Rating: 300 psig (2070 kPa).
    b. Body Material: ASTM A 536, ductile iron.
    c. Seal: EPDM.
    d. Disc: Spring-operated, ductile iron or stainless steel.

2.07 IRON GATE VALVES

A. Class 125, OS&Y, Iron Gate Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. NIBCO INC.

b. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:
   a. Standard: MSS SP-70, Type I.
   b. CWP Rating: 200 psig (1380 kPa).
   c. Body Material: ASTM A 126, gray iron with bolted bonnet.
   d. Ends: Flanged.
   e. Trim: Bronze.
   f. Disc: Solid wedge.
   g. Packing and Gasket: Asbestos free.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.

B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.

C. Examine threads on valve and mating pipe for form and cleanliness.

D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.

E. Do not attempt to repair defective valves; replace with new valves.

3.02 VALVE INSTALLATION

A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

B. Locate valves for easy access and provide separate support where necessary.

C. Install valves in horizontal piping with stem at or above center of pipe.

D. Install valves in position to allow full stem movement.

E. Install check valves for proper direction of flow and as follows:
   1. Swing Check Valves: In horizontal position with hinge pin level.
   2. Center-Guided and Plate-Type Check Valves: In horizontal or vertical position, between flanges.
   3. Lift Check Valves: With stem upright and plumb.

3.03 ADJUSTING

A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.04 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

A. If valve applications are not indicated, use the following:

1. Shutoff Service: Ball, or gate valves.
2. Pump-Discharge Check Valves:
    a. NPS 2 (DN 50) and Smaller: Bronze swing check valves with nonmetallic disc.
    b. NPS 2-1/2 (DN 65) and Larger for Domestic Water: Iron swing check valves with lever and weight or with spring or iron, center-guided, resilient-seat check valves.
    c. NPS 2-1/2 (DN 65) and Larger for Sanitary Waste and Storm Drainage: Iron swing check valves with lever and weight or spring.

B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.

C. Select valves, except wafer types, with the following end connections:

1. For Copper Tubing, NPS 2 (DN 50) and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
2. For Copper Tubing, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Flanged ends except where threaded valve-end option is indicated in valve schedules below.
3. For Copper Tubing, NPS 5 (DN 125) and Larger: Flanged ends.
4. For Steel Piping, NPS 2 (DN 50) and Smaller: Threaded ends.
5. For Steel Piping, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Flanged ends except where threaded valve-end option is indicated in valve schedules below.
6. For Steel Piping, NPS 5 (DN 125) and Larger: Flanged ends.
7. For Grooved-End Copper Tubing and Steel Piping: Valve ends may be grooved.

3.05 DOMESTIC, HOT- AND COLD-WATER VALVE SCHEDULE

A. Pipe NPS 2 (DN 50) and Smaller:

1. Ball Valves: Two piece, full port, brass or bronze with stainless-steel trim. May be provided with solder-joint ends instead of threaded ends.
2. Bronze Swing Check Valves: Class 125 nonmetallic disc.

B. Pipe larger than 2”:

1. Bronze and Brass Valves: May be provided with solder-joint ends instead of threaded ends.
2. Ball Valves: Two piece, full port, brass or bronze with stainless-steel trim.

3. Bronze Swing Check Valves: Class 125 nonmetallic disc.

3.06 SANITARY-WASTE AND STORM-DRAINAGE VALVE SCHEDULE

A. Pipe NPS 4 (DN 50) and Smaller:

1. Bronze and Brass Valves: May be provided with solder-joint ends instead of threaded ends.
2. Ball Valves: Two piece, full port, brass or bronze with stainless-steel trim.
3. Bronze Swing Check Valves: Class 125 nonmetallic disc.

B. Pipe NPS 6 (DN 65) and Larger:

1. Iron Valves, NPS 2-1/2 to NPS 4 (DN 65 to DN 100): May be provided with threaded ends instead of flanged ends.
2. Iron Swing Check Valves: Class 125 nonmetallic-to-metal seats.
3. Iron, Grooved-End Swing Check Valves: 300 CWP.
4. Iron Gate Valves: Class 125 OS&Y.
5. Iron Globe Valves: Class 125.

END OF SECTION

SECTION 22 0529

HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General Conditions and other Division 1 Specification Sections, apply to the Work of this Section.

1.02 SUMMARY

A. Section Includes:

1. Metal pipe hangers and supports.
2. Trapeze pipe hangers.
3. Metal framing systems.
4. Thermal-hanger shield inserts.
5. Fastener systems.
6. Pipe positioning systems.
7. Equipment supports.

B. Related Sections:

1. Section 055000 "Metal Fabrications" for structural-steel shapes and plates for trapeze hangers for pipe and equipment supports.

1.03 DEFINITIONS

A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

1.04 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.

1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.

2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
3. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

1.05 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details and include calculations for the following; include: Product Data for components:
1. Trapeze pipe hangers.
2. Metal framing systems.
3. Pipe stands.
4. Equipment supports.

C. Delegated-Design Submittal: For trapeze hangers indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
1. Detail fabrication and assembly of trapeze hangers.
2. Design Calculations: Calculate requirements for designing trapeze hangers.

1.06 INFORMATIONAL SUBMITTALS

A. Welding certificates.

1.07 QUALITY ASSURANCE

A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

PART 2 - PRODUCTS

2.01 METAL PIPE HANGERS AND SUPPORTS

A. Carbon-Steel Pipe Hangers and Supports:
1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
3. Nonmetallic Coatings: Plastic coating, jacket, or liner.

4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

B. Copper Pipe Hangers:

1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
2. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel.

2.02 TRAPEZE PIPE HANGERS

A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.03 THERMAL-HANGER SHIELD INSERTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Carpenter & Paterson, Inc.
2. Clement Support Services.
3. ERICO International Corporation.
4. National Pipe Hanger Corporation.
5. PHS Industries, Inc.
6. Pipe Shields, Inc.; a subsidiary of Piping Technology & Products, Inc.
7. Piping Technology & Products, Inc.
8. Rilco Manufacturing Co., Inc.
9. Value Engineered Products, Inc.

B. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with 100-psig (688-kPa) or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig (862-kPa) minimum compressive strength and vapor barrier.

C. Insulation-Insert Material for Hot Piping: ASTM C 552, Type II cellular glass with 100-psig (688-kPa) or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig (862-kPa) minimum compressive strength.

D. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

E. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

F. Insert Length: Extend 2 inches (50 mm) beyond sheet metal shield for piping operating below ambient air temperature.

2.04 FASTENER SYSTEMS

A. Mechanical-Expansion Anchors: Insert-wedge-type, stainless- steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

2.05 PIPE POSITIONING SYSTEMS

A. Description: IAPMO PS 42, positioning system of metal brackets, clips, and straps for positioning piping in pipe spaces; for plumbing fixtures in commercial applications.

2.06 EQUIPMENT SUPPORTS

A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

2.07 MISCELLANEOUS MATERIALS

A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.

B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

1. Properties: Nonstaining, noncorrosive, and nongaseous.

2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

PART 3 - EXECUTION

3.01 HANGER AND SUPPORT INSTALLATION

A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.

B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.

1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.

2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.

C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled metal framing systems.

D. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.

E. Fastener System Installation:

1. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

F. Pipe Positioning-System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture.

G. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories. Bending of hanger rods is prohibited.

H. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

I. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

J. Install lateral bracing with pipe hangers and supports to prevent swaying.

K. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 (DN 65) and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

L. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

M. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

N. Insulated Piping:

1. Attach clamps and spacers to piping.

a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.

b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.

c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.

a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.

3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.

a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.

4. Shield Dimensions for Pipe: Not less than the following:

a. NPS 1/4 to NPS 3-1/2 (DN 8 to DN 90): 12 inches (305 mm) long and 0.048 inch (1.22 mm) thick.

b. NPS 4 (DN 100): 12 inches (305 mm) long and 0.06 inch (1.52 mm) thick.

c. NPS 5 and NPS 6 (DN 125 and DN 150): 18 inches (457 mm) long and 0.06 inch (1.52 mm) thick.

d. NPS 8 to NPS 14 (DN 200 to DN 350): 24 inches (610 mm) long and 0.075 inch (1.91 mm) thick.

e. NPS 16 to NPS 24 (DN 400 to DN 600): 24 inches (610 mm) long and 0.105 inch (2.67 mm) thick.

5. Pipes NPS 8 (DN 200) and Larger: Include wood or reinforced calcium-silicate-insulation inserts of length at least as long as protective shield.

6. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.02 EQUIPMENT SUPPORTS

A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.

B. Grouting: Place grout under supports for equipment and make bearing surface smooth.

C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.03 METAL FABRICATIONS

A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.

B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

2. Obtain fusion without undercut or overlap.

3. Remove welding flux immediately.

4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.04 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches (40 mm).

3.05 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils (0.05 mm).

B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 9.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.06 HANGER AND SUPPORT SCHEDULE

A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.

B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use carbon-steel pipe hangers and supports, metal trapeze pipe hangers and metal framing systems and attachments for general service applications.

F. Use stainless-steel pipe hangers and stainless-steel or corrosion-resistant attachments for hostile environment applications.

G. Use copper-plated pipe hangers and copper or stainless-steel attachments for copper piping and tubing.

H. Use padded hangers for piping that is subject to scratching.

I. Use thermal-hanger shield inserts for insulated piping and tubing.

J. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30 (DN 15 to DN 750).

2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg F (566 deg C), pipes NPS 4 to NPS 24 (DN 100 to DN 600), requiring up to 4 inches (100 mm) of insulation.

3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36 (DN 20 to DN 900), requiring clamp flexibility and up to 4 inches (100 mm) of insulation.

4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 (DN 15 to DN 600) if little or no insulation is required.
5. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4 (DN 15 to DN 100), to allow off-center closure for hanger installation before pipe erection.
6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated, stationary pipes NPS 3/4 to NPS 8 (DN 20 to DN 200).
7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8 (DN 15 to DN 200).
8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8 (DN 15 to DN 200).
9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8 (DN 15 to DN 200).
10. Split Pipe Ring with or without Turnbuckle Hangers (MSS Type 11): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 8 (DN 10 to DN 200).
11. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 3 (DN 10 to DN 80).
12. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30 (DN 15 to DN 750).
13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
14. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36 (DN 100 to DN 900), with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.
15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36 (DN 100 to DN 900), with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
16. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 (DN 65 to DN 900) if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.
17. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30 (DN 25 to DN 750), from two rods if longitudinal movement caused by expansion and contraction might occur.
18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes NPS 2-1/2 to NPS 24 (DN 65 to DN 600), from single rod if horizontal movement caused by expansion and contraction might occur.
19. Complete Pipe Rolls (MSS Type 44): For support of pipes NPS 2 to NPS 42 (DN 50 to DN 1050) if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.

20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes NPS 2 to NPS 24 (DN 50 to DN 600) if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes NPS 2 to NPS 30 (DN 50 to DN 750) if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.

K. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24 (DN 24 to DN 600).
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 (DN 20 to DN 600) if longer ends are required for riser clamps.

L. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches (150 mm) for heavy loads.
2. Steel Clevises (MSS Type 14): For 120 to 450 deg F (49 to 232 deg C) piping installations.
3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F (49 to 232 deg C) piping installations.

M. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
3. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
4. C-Clamps (MSS Type 23): For structural shapes.
5. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
6. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
7. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.

8. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
9. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:
    a. Light (MSS Type 31): 750 lb (340 kg).
    b. Medium (MSS Type 32): 1500 lb (680 kg).
    c. Heavy (MSS Type 33): 3000 lb (1360 kg).
10. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
11. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.

N. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.

O. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.

P. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.

Q. Use mechanical-expansion anchors instead of building attachments where required in concrete construction.

R. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

END OF SECTION

SECTION 22 0553

IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General Conditions and other Division 1 Specification Sections, apply to the Work of this Section.

1.02 SUMMARY

A. Section Includes:

1. Equipment labels.
2. Warning signs and labels.
3. Pipe labels.
4. Stencils.
5. Valve tags.
6. Warning tags.

1.03 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For color, letter style, and graphic representation required for each identification material and device.

C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.

D. Valve numbering scheme.

E. Valve Schedules: For each piping system to include in maintenance manuals.

1.04 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.01 EQUIPMENT LABELS

A. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch (1.6 mm) thick, and having predrilled holes for attachment hardware.
2. Letter Color: White.
3. Background Color: Black.
4. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).
5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
6. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
7. Fasteners: Stainless-steel rivets or self-tapping screws.

B. Label Content: Include equipment's Drawing designation or unique equipment number, drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.

C. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch (A4) bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.02 WARNING SIGNS AND LABELS

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch (1.6 mm) thick, and having predrilled holes for attachment hardware.

B. Letter Color: Black.

C. Background Color: Yellow.

D. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).

E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).

F. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

G. Fasteners: Stainless-steel rivets or self-tapping screws.

H. Label Content: Include caution and warning information, plus emergency notification instructions.

2.03 PIPE LABELS

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to partially cover circumference of pipe and to attach to pipe without fasteners or adhesive.

C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.

2. Lettering Size: At least 1-1/2 inches (38 mm) high.

2.04 STENCILS

A. Stencils: Prepared with letter sizes according to ASME A13.1 for piping; and minimum letter height of 3/4 inch (19 mm) for access panel and door labels, equipment labels, and similar operational instructions.

1. Stencil Paint: Exterior, gloss, acrylic enamel black unless otherwise indicated. Paint may be in pressurized spray-can form.

2. Identification Paint: Exterior, acrylic enamel in colors according to ASME A13.1 unless otherwise indicated.

2.05 VALVE TAGS

A. Valve Tags: Stamped or engraved with 1/4-inch (6.4-mm) letters for piping system abbreviation and 1/2-inch (13-mm) numbers.

1. Tag Material: Brass, 0.032-inch (0.8-mm) minimum thickness and having predrilled or stamped holes for attachment hardware.

2. Fasteners: Brass wire-link or beaded chain; or S-hook.

B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch (A4) bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Valve-tag schedule shall be included in operation and maintenance data.

2.06 WARNING TAGS

A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.

1. Size: 3 by 5-1/4 inches (75 by 133 mm) minimum.
2. Fasteners: Brass grommet and wire.
3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
4. Color: Yellow background with black lettering.

PART 3 - EXECUTION

3.01 PREPARATION

A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.02 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment.

B. Locate equipment labels where accessible and visible.

3.03 PIPE LABEL INSTALLATION

A. Stenciled Pipe Label Option: Stenciled labels may be provided instead of manufactured pipe labels, at Installer's option. Install stenciled pipe labels, complying with ASME A13.1, on each piping system.

1. Identification Paint: Use for contrasting background.
2. Stencil Paint: Use for pipe marking.

B. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.

6. Spaced at maximum intervals of 50 feet (15 m) along each run. Reduce intervals to 25 feet (7.6 m) in areas of congested piping and equipment.
7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

C. Pipe Label Color Schedule:

1. Domestic Water Piping:
   a. Background Color: Green.
   b. Letter Color: White.
2. Sanitary Waste and Storm Drainage Piping:
   a. Background Color: Green.
   b. Letter Color: White.

3.04 VALVE-TAG INSTALLATION

A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.

B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:

1. Valve-Tag Size and Shape:
   a. Cold Water: 1-1/2 inches (38 mm) round.
   b. Hot Water: 1-1/2 inches (38 mm) round.
2. Valve-Tag Color:
   a. Cold Water: Natural.
   b. Hot Water: Natural.
3. Letter Color:
   a. Cold Water: Black.
   b. Hot Water: Black.

3.05 WARNING-TAG INSTALLATION

A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION

SECTION 22 0719

PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General Conditions and other Division 1 Specification Sections, apply to the Work of this Section.

1.02 SUMMARY

A. Section includes insulating the following plumbing piping services:

1. Domestic cold-water piping.
2. Domestic hot-water piping.
3. Domestic recirculating hot-water piping.
4. Roof drains and rainwater leaders.
5. Supplies and drains for handicap-accessible lavatories and sinks.

1.03 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied, if any).

1.04 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

1.05 QUALITY ASSURANCE

A. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84 by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

B. Comply with the following applicable standards and other requirements specified for miscellaneous components:

1. Supply and Drain Protective Shielding Guards: ICC A117.1.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.07 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

B. Coordinate clearance requirements with piping Installer for piping insulation application. Establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

C. Coordinate installation and testing of heat tracing.

1.08 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

1.09 PRE-INSTALLATION MEETING

A. Schedule and hold a pre-installation meeting with the Owner’s Representative prior to starting insulation work.

PART 2 - PRODUCTS

2.01 INSULATION MATERIALS

A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Aeroflex USA, Inc.; Aerocel.

b. Armacell LLC; AP Armaflex.

c. K-Flex USA; Insul-Lock, Insul-Tube, and K-FLEX LS.

G. Mineral-Fiber, Preformed Pipe Insulation:

1. Products: Subject to compliance with requirements, provide one of the following:

a. Fibrex Insulations Inc.; Coreplus 1200.

b. Johns Manville; Micro-Lok.

c. Knauf Insulation; 1000-Degree Pipe Insulation.

d. Manson Insulation Inc.; Alley-K.

e. Owens Corning; Fiberglas Pipe Insulation.

2. Type I, 850 Deg F (454 Deg C) Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ-SSL. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

2.02 VALVES

A. Insulate valves with same material as piping and provide a nondestructive removable jacket.

2.03 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

B. Flexible Elastomeric Adhesive: Comply with MIL-A-24179A, Type II, Class I.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Aeroflex USA, Inc.; Aeroseal.

b. Armacell LLC; Armaflex 520 Adhesive.

c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-75.

d. K-Flex USA; R-373 Contact Adhesive.

2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. Products: Subject to compliance with requirements, provide one of the following:
    a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-127.
    b. Eagle Bridges - Marathon Industries; 225.
    c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-60/85-70.
    d. Mon-Eco Industries, Inc.; 22-25.
2. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

D. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
1. Products: Subject to compliance with requirements, provide one of the following:
    a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-82.
    b. Eagle Bridges - Marathon Industries; 225.
    c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-20.
    d. Mon-Eco Industries, Inc.; 22-25.
2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.04 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.
1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below-ambient services.
1. Products: Subject to compliance with requirements, provide one of the following:
    a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-80/30-90.
    b. Vimasco Corporation; 749.
2. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm (0.009 metric perm) at 43-mil (1.09-mm) dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F (Minus 29 to plus 82 deg C).
4. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
5. Color: White.

2.05 SEALANTS

A. Joint Sealants:

1. Joint Sealants for Cellular-Glass and Phenolic Products: Subject to compliance with requirements, provide one of the following:
   a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.
   b. Eagle Bridges - Marathon Industries; 405.
   c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-45.
   d. Mon-Eco Industries, Inc.; 44-05.
   e. Pittsburgh Corning Corporation; Pittseal 444.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Permanently flexible, elastomeric sealant.
4. Service Temperature Range: Minus 100 to plus 300 deg F (Minus 73 to plus 149 deg C).
5. Color: White or gray.
6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. ASJ Flashing Sealants:

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F (Minus 40 to plus 121 deg C).
5. Color: White.
6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.06 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.

2.07 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, provide one of the following:
    a. ABI, Ideal Tape Division; 428 AWF ASJ.
    b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0836.
    c. Compac Corporation; 104 and 105.
    d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.
2. Width: 3 inches (75 mm).
3. Thickness: 11.5 mils (0.29 mm).
4. Adhesion: 90 ounces' force/inch (1.0 N/mm) in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch (7.2 N/mm) in width.
7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

2.08 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Covers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Engineered Brass Company.
    b. Insul-Tect Products Co.; a subsidiary of MVG Molded Products.
    c. McGuire Manufacturing.
    d. Plumberex.
    e. Truebro; a brand of IPS Corporation.
    f. Zurn Industries, LLC; Tubular Brass Plumbing Products Operation.
2. Description: Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.03 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Keep insulation materials dry during application and finishing.

G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

H. Install insulation with least number of joints practical.

I. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

K. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch- (75-mm-) wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches (100 mm) o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches (38 mm). Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap.
    a. For below-ambient services, apply vapor-barrier mastic over staples.
4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.

L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches (100 mm) beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

O. For above-ambient services, do not install insulation to the following:

1. Vibration-control devices.
2. Testing agency labels and stamps.
3. Nameplates and data plates.
4. Cleanouts.

3.04 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.

B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.

C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.

2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches (50 mm).
4. Seal jacket to wall flashing with flashing sealant.

D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.

1. Comply with requirements in Division 7 firestopping section for firestopping and fire-resistive joint sealers.

F. Insulation Installation at Floor Penetrations:

1. Pipe: Install insulation continuously through floor penetrations.
2. Seal penetrations through fire-rated assemblies. Comply with requirements in Division 7 firestopping section for firestopping and fire-resistive joint sealers.

3.05 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.

5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
9. Stencil or label the outside insulation jacket of each union with the word "union." Match size and color of pipe labels.

C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

D. Install removable insulation covers where required. Installation shall conform to the following:

1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches (50 mm) over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.

5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.06 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed valve covers manufactured of same material as pipe insulation when available.
2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.07 INSTALLATION OF MINERAL-FIBER INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward clinched staples at 6 inches (150 mm) o.c.

4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch (25 mm), and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.08 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Inspect pipe, fittings, strainers, and valves, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to three locations of straight pipe, three locations of fittings, three locations of threaded valves for each pipe service defined in the "Piping Insulation Schedule, General" Article.

C. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.09 PIPING INSULATION SCHEDULE, GENERAL

A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:

1. Drainage piping located in crawl spaces.
2. Underground piping.
3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.10 INDOOR PIPING INSULATION SCHEDULE

A. Domestic Cold Water:

1. NPS 1 (DN 25) and Smaller: Insulation shall be the following:
   a. Flexible Elastomeric: 1/2 inch (13 mm) thick.
2. NPS 1-1/4 (DN 32) and Larger: Insulation shall be the following:
   a. Flexible Elastomeric: 1 inch (25 mm) thick.

B. Domestic Hot and Recirculated Hot Water

1. NPS 1-1/4 (DN 32) and Smaller: Insulation shall be one of the following:
   a. Flexible Elastomeric: 1 inch (25 mm) thick.
   b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch (25 mm) thick.
2. NPS 1-1/2 (DN 40) and Larger: Insulation shall be one of the following:
   a. Flexible Elastomeric: 1 inch (25 mm) thick.
   b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch (25 mm) thick.

C. Stormwater and Overflow:

1. All Pipe Sizes: Insulation shall be the following:
   a. Flexible Elastomeric: 1 inch (25 mm) thick.

D. Roof Drain and Overflow Drain Bodies:

1. All Pipe Sizes: Insulation shall be the following:
   a. Flexible Elastomeric: 1 inch (25 mm) thick.

E. Floor Drains, Traps, and Sanitary Drain Piping within 10 Feet (3 m) of Drain Receiving Condensate and Equipment Drain Water below 60 Deg F (16 Deg C):

1. All Pipe Sizes: Insulation shall be the following:
   a. Flexible Elastomeric: 3/4 inch (19 mm) thick.

END OF SECTION

SECTION 22 1116
DOMESTIC WATER PIPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General Conditions and other Division 1 Specification Sections, apply to the Work of this Section.

1.02 SUMMARY

A. Section Includes:

1. Under-building-slab and aboveground domestic water pipes, tubes, and fittings inside buildings.

1.03 ACTION SUBMITTALS

A. Product Data: For transition fittings and dielectric fittings.

1.04 INFORMATIONAL SUBMITTALS

A. System purging and disinfecting activities report.

B. Field quality-control reports.

1.05 FIELD CONDITIONS

A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of water service.

2. Do not interrupt water service without Owner's written permission.

1.06 PRE-INSTALLATION MEETING

A. Schedule and hold a pre-installation meeting with the Owner’s Representative prior to starting domestic water piping work.

PART 2 - PRODUCTS

2.01 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

B. Potable-water piping and components shall comply with NSF 14 and NSF 61. Plastic piping components shall be marked with "NSF-pw."

2.02 COPPER TUBE AND FITTINGS

A. Soft Copper Tube: ASTM B 88, Type K (ASTM B 88M, Type A) water tube, annealed temper.

B. Cast-Copper, Solder-Joint Fittings: ASME B16.18, pressure fittings.

C. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.

D. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.

E. Copper Unions:

1. MSS SP-123.
2. Cast-copper-alloy, hexagonal-stock body.
3. Ball-and-socket, metal-to-metal seating surfaces.
4. Solder-joint or threaded ends.

2.03 DUCTILE-IRON PIPE AND FITTINGS

A. Mechanical-Joint, Ductile-Iron Pipe:

1. AWWA C151/A21.51, with mechanical-joint bell and plain spigot end unless grooved or flanged ends are indicated.
2. Glands, Gaskets, and Bolts: AWWA C111/A21.11, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

B. Standard-Pattern, Mechanical-Joint Fittings:

1. AWWA C110/A21.10, ductile or gray iron.
2. Glands, Gaskets, and Bolts: AWWA C111/A21.11, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

C. Compact-Pattern, Mechanical-Joint Fittings:

1. AWWA C153/A21.53, ductile iron.
2. Glands, Gaskets, and Bolts: AWWA C111/A21.11, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

D. Plain-End, Ductile-Iron Pipe: AWWA C151/A21.51.

2.04 CPVC PIPING

A. CPVC Pipe: ASTM F 441/F 441M, Schedule 80.

1. CPVC Socket Fittings: ASTM F 439 for Schedule 80.
2. CPVC Threaded Fittings: ASTM F 437, Schedule 80.

2.05 PEX TUBE AND FITTINGS

A. Piping

1. All pipe shall be high-density crosslinked polyethylene manufactured using the high-pressure peroxide method of crosslinking (PEXa). Pipe shall conform to ASTM F876, ASTM F877 CSA B137.5, NSF/ANSI 14, and NSF/ANSI 61.
2. Supplier shall provide pipe in sizes 3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2 and 2 in
3. Pipe shall be rated for continuous operation of 100 psi gauge pressure at 180°F temperature (690 kPa @ 82°C), and shall have a rating pf 80 psi gauge pressure at 200°F temperature (550 kPa @ 93°C) per the manufacturer's requirements.
4. Pipe shall be certified by PPI to standard TR-3, with applicable plumbing and mechanical code certifications.
5. Pipe to be manufactured using a high-pressure peroxide method with a minimum degree of crosslinking of 70-89% when tested in accordance with ASTM D2765, Method B.
6. Pipe to be tested for resistance to hot chlorinated water in accordance with ASTM F2023. Pipe to have a minimum extrapolated time-to-failure of 50 years, calculated in accordance with section 13.3 of F2023 and listed as "3306" per the ASTM F876 standard.
7. PEXa pipe to have a co-extruded red, white or blue UV Shield made from UV-resistant polyethylene providing a minimum UV resistance of 6 months when tested according to ASTM F2657. In addition, pipe shall have a manufacturer's recommended UV resistance of 12 months based on additional testing to ASTM F2657.
8. Pipe to be manufactured in an ISO 9001 certified production facility.
9. Pipe to have a Flame Spread Index and a Smoke Developed Index listing to ASTM E84 (in U.S.) or CAN/ULC S102.2 (in Canada) with insulation as necessary.

B. Fittings

1. All Fittings used with crosslinked polyethylene (PEXa) water distribution pipe intended for plumbing applications shall be cold-expansion PEXa compression-sleeve fittings.
2. All polymer fittings shall be made from modified PPSU (black).
3. All brass fittings shall be lead free brass made from ECO BRASS UNS C69300 or equivalent.
4. All compression sleeves shall be made from PEXa crosslinked polyethylene.

5. All fittings shall be third-party certified to applicable standards ASTM F877, NSF/ANSI 14, NSF/ANSI 61 and CSA B137.5.
6. Where joints are encased in concrete or buried underground, joints shall be wrapped if required per the manufacturer's recommendation to protect the material.

C. Manifolds
1. Material: Distribution manifolds shall be manufactured of copper and be supplied by the piping manufacturer as a proven cataloged part of the manufacturer's system.
2. Copper manifolds
a. Copper manifolds shall be manufactured from Type L copper.
b. Copper and/or brass outlets shall be high-temperature brazed (lead-free) into headers.

D. Markings
1. Pipe shall carry the following markings every three (3) feet (0.9 meters): Manufacturer's name or trademark, nominal size, PEXa 3306 (material designation) SDR9 (standard dimension ratio), ASTM F876/ F877 / F2080, CSA B137.5, NSF-pw, U.P. Code, 160 psi @ 73.4°F / 100 psi @ 180°F / 80 psi @ 200°F, POTABLE TUBING, manufacturing date and footage mark.
2. Cold expansion PEXa compression-sleeve fittings shall be marked with manufacturer's designation, production code, and certification markings.

E. Packaging
1. Coiled pipe shall be shipped in protective packaging marked with product name and size.
2. Straight lengths shall be packed in plastic bags.

2.06 PIPING JOINING MATERIALS

A. Pipe-Flange Gasket Materials:
1. AWWA C110/A21.10, rubber, flat face, 1/8 inch (3.2 mm) thick or ASME B16.21, nonmetallic and asbestos free unless otherwise indicated.
2. Full-face or ring type unless otherwise indicated.

B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

C. Solder Filler Metals: ASTM B 32, lead-free alloys.

D. Flux: ASTM B 813, water flushable.

2.07 TRANSITION FITTINGS

A. General Requirements:

1. Same size as pipes to be joined.
2. Pressure rating at least equal to pipes to be joined.
3. End connections compatible with pipes to be joined.

B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.

C. Sleeve-Type Transition Coupling: AWWA C219.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Cascade Waterworks Manufacturing.
   b. Dresser, Inc.; Piping Specialties Products.
   c. Ford Meter Box Company, Inc. (The).
   d. JCM Industries.
   e. Romac Industries, Inc.
   f. Smith-Blair, Inc.; a Sensus company.
   g. Viking Johnson.

2.08 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

B. Dielectric Flanges:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Capitol Manufacturing Company; member of the Phoenix Forge Group.
   b. Central Plastics Company.
   c. Matco-Norca.
   d. Watts; a division of Watts Water Technologies, Inc.
   e. Wilkins; a Zurn company.
2. Standard: ASSE 1079.
3. Factory-fabricated, bolted, companion-flange assembly.
4. Pressure Rating: 125 psig (860 kPa) minimum at 180 deg F (82 deg C).
5. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

C. Dielectric-Flange Insulating Kits:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Advance Products & Systems, Inc.
      b. Calpico, Inc.
      c. Central Plastics Company.
      d. Pipeline Seal and Insulator, Inc.
   2. Nonconducting materials for field assembly of companion flanges.
   3. Pressure Rating: 150 psig (1035 kPa).
   4. Gasket: Neoprene or phenolic.
   5. Bolt Sleeves: Phenolic or polyethylene.
   6. Washers: Phenolic with steel backing washers.

D. Dielectric Nipples:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Elster Perfection Corporation.
      b. Grinnell Mechanical Products; Tyco Fire Products LP.
      c. Matco-Norca.
      d. Precision Plumbing Products, Inc.
      e. Victaulic Company.
   2. Standard: IAPMO PS 66.
   3. Electroplated steel nipple complying with ASTM F 1545.
   4. Pressure Rating and Temperature: 300 psig (2070 kPa) at 225 deg F (107 deg C).
   5. End Connections: Male threaded or grooved.
   6. Lining: Inert and noncorrosive, propylene.

PART 3 - EXECUTION

3.01 EARTHWORK

A. Comply with requirements in Section 31 20 00 "Earth Moving" for excavating, trenching, and backfilling.

3.02 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."

C. Install ductile-iron piping under building slab with restrained joints according to AWWA C600 and AWWA M41.

D. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve inside the building at each domestic water-service entrance. Comply with requirements for pressure gages in Section 220519 "Meters and Gages for Plumbing Piping" and with requirements for drain valves and strainers in Section 221119 "Domestic Water Piping Specialties."

E. Install shutoff valve immediately upstream of each dielectric fitting.

F. Install domestic water piping level with 0.25 percent slope downward toward drain and plumb.

G. Rough-in domestic water piping for water-meter installation according to utility company's requirements.

H. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.

I. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

J. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.

K. Install piping to permit valve servicing.

L. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.

M. Install piping free of sags and bends.

N. Install fittings for changes in direction and branch connections.

O. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.

P. Install pressure gages on suction and discharge piping for each plumbing pump. Comply with requirements for pressure gages in Section 22 05 19 "Meters and Gages for Plumbing Piping."

Q. Install thermostats in hot-water circulation piping. Comply with requirements for thermostats in Section 22 11 23 "Domestic Water Pumps."

R. Install thermometers on inlet and outlet piping from each water heater. Comply with requirements for thermometers in Section 22 05 19 "Meters and Gages for Plumbing Piping."

S. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."

T. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."

U. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

3.03 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

D. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."

E. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.

3.04 TRANSITION FITTING INSTALLATION

A. Install transition couplings at joints of dissimilar piping.

B. Transition Fittings in Underground Domestic Water Piping:

1. Fittings for NPS 1-1/2 (DN 40) and Smaller: Fitting-type coupling.
2. Fittings for NPS 2 (DN 50) and Larger: Sleeve-type coupling.

C. Transition Fittings in Aboveground Domestic Water Piping NPS 2 (DN 50) and Smaller: Plastic-to-metal transition fittings or unions.

3.05 DIELECTRIC FITTING INSTALLATION

A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.

B. Dielectric Fittings for NPS 2 (DN 50) and Smaller: Use dielectric nipples.

C. Dielectric Fittings for NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Use dielectric flange kits or nipples.

D. Dielectric Fittings for NPS 5 (DN 125) and Larger: Use dielectric flange kits.

3.06 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements for pipe hanger, support products, and installation in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
   1. Vertical Piping: MSS Type 8 or 42, clamps.
   2. Individual, Straight, Horizontal Piping Runs:
      a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
      b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
      c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.
   3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
   4. Base of Vertical Piping: MSS Type 52, spring hangers.

B. Support vertical piping and tubing at base and at each floor.

C. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.

D. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
   1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
   2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
   3. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
   4. NPS 2-1/2: 108 inches with 1/2-inch rod.
   5. NPS 3 to NPS 5: 10 feet with 1/2-inch rod.

E. Install supports for vertical copper tubing every 10 feet.

F. Install vinyl-coated hangers for CPVC piping with the following maximum horizontal spacing and minimum rod diameters:
   1. NPS 1 (DN 25) and Smaller: 36 inches (900 mm) with 3/8-inch (10-mm) rod.
   2. NPS 1-1/4 to NPS 2 (DN 32 to DN 50): 48 inches (1200 mm) with 3/8-inch (10-mm) rod.
   3. NPS 2-1/2 to NPS 3-1/2 (DN 65 to DN 90): 48 inches (1200 mm) with 1/2-inch (13-mm) rod.
   4. NPS 4 and NPS 5 (DN 100 and DN 125): 48 inches (1200 mm) with 5/8-inch (16-mm) rod.
   5. NPS 6 (DN 150): 48 inches (1200 mm) with 3/4-inch (19-mm) rod.
   6. NPS 8 (DN 200): 48 inches (1200 mm) with 7/8-inch (22-mm) rod.

G. Install supports for vertical CPVC piping every 60 inches (1500 mm) for NPS 1 (DN 25) and smaller, and every 72 inches (1800 mm) for NPS 1-1/4 (DN 32) and larger.

H. Install vinyl-coated hangers for PEX piping with the following maximum horizontal spacing and minimum rod diameters:
   1. NPS 2 (DN 51) and Smaller: 32 inches (815 mm) with 3/8-inch (10-mm) rod.

I. Install hangers for vertical PEX piping every 48 inches (1200 mm).

J. Support piping and tubing not listed in this article according to MSS SP-69 and manufacturer's written instructions.

3.07 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.

C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.

D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:

1. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.

2. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.

3. Equipment: Cold- and hot-water-supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 (DN 65) and larger.

3.08 IDENTIFICATION

A. Identify system components. Comply with requirements for identification materials and installation in Section 220553 "Identification for Plumbing Piping and Equipment."

B. Label pressure piping with system operating pressure.

3.09 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Piping Inspections:

a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.

b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:

1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.

2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.

c. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.

d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

2. Piping Tests:

a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.

b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.

c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.

d. Cap and subject piping to static water pressure of 50 psig (345 kPa) above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.

e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.

f. Prepare reports for tests and for corrective action required.

B. Domestic water piping will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.10 ADJUSTING

A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.

2. Open shutoff valves to fully open position.

3. Open throttling valves to proper setting.

4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.

a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide hot-water flow in each branch.

b. Adjust calibrated balancing valves to flows indicated.

5. Remove plugs used during testing of piping and for temporary sealing of piping during installation.

6. Remove and clean strainer screens. Close drain valves and replace drain plugs.

7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.

8. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.11 CLEANING

A. Clean and disinfect potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.

2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:

a. Flush piping system with clean, potable water until dirty water does not appear at outlets.

b. Fill and isolate system according to either of the following:

1) Fill system or part thereof with water/chlorine solution with at least 50 ppm (50 mg/L) of chlorine. Isolate with valves and allow to stand for 24 hours.

2) Fill system or part thereof with water/chlorine solution with at least 200 ppm (200 mg/L) of chlorine. Isolate and allow to stand for three hours.

c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.

d. Repeat procedures if biological examination shows contamination.

e. Submit water samples in sterile bottles to authorities having jurisdiction.

B. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.

C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.12 PIPING SCHEDULE

A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.

C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.

D. Under-building-slab, domestic water, building-service piping, NPS 3 and smaller shall be one of the following:

1. Annealed-temper copper tube, ASTM B88, Type K; wrought-copper, solder-joint fittings; and brazed joints.

E. Under-building-slab, domestic water, building-service piping, NPS 4 to NPS 8 and larger shall be the following:

1. Mechanical-joint, ductile-iron pipe; standard-or compact-pattern, mechanical-joint fittings; and mechanical joints.

F. Aboveground domestic water piping, NPS 2 and smaller, shall be one of the following:

1. CPVC Tubing System: CPVC tube; CPVC socket fittings; and solvent-cemented joints.

2. PEX tube, Piping branch off riser within units 1-1/4" and smaller.

a. Fittings for PEX tube:

1) ASTM F1807, metal insert and copper crimp rings.

2) ASTM F1960, cold expansion fittings and reinforcing rings.

3) ASSE 1061, push-fit fittings.

G. Aboveground domestic water piping, NPS 2-1/2 to NPS 6, shall be one of the following:

1. CPVC, Schedule 80 pipe; CPVC, Schedule 80 socket fittings; and joints.

H. Aboveground domestic water piping, of any size, in return air plenums, shall be one of the following:

1. Drawn-temper copper tube, ASTM B88, Type L; cast- or wrought-copper, solder-joint fittings; and soldered joints.

2. Drawn-temper copper tube, ASTM B88, Type L; copper pressure-seal-joint fittings; and pressure-sealed joints.

3. Drawn-temper copper tube, ASTM B88, Type L; copper push-on-joint fittings; and push-on joints.

3.13 VALVE SCHEDULE

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Shutoff Duty: Use ball valves for piping NPS 2 (DN 50) and smaller. Use butterfly, ball, or gate valves with flanged ends for piping NPS 2-1/2 (DN 65) and larger.

2. Throttling Duty: Use ball or globe valves for piping NPS 2 (DN 50) and smaller. Use butterfly or ball valves with flanged ends for piping NPS 2-1/2 (DN 65) and larger.

3. Hot-Water Circulation Piping, Balancing Duty: Calibrated balancing valves.

4. Drain Duty: Hose-end drain valves.

B. Use check valves to maintain correct direction of domestic water flow to and from equipment.

END OF SECTION

SECTION 22 1119
DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Vacuum breakers.
2. Backflow preventers.
3. Balancing valves.
4. Strainers.
5. Hose bibbs.
6. Wall hydrants.
7. Drain valves.
8. Water-hammer arresters.
9. Air vents.
10. Flexible connectors.
11. Hose Reels

B. Related Requirements:
1. Section 22 05 19 "Meters and Gages for Plumbing Piping" for thermometers, pressure gages, and flow meters in domestic water piping.
2. Section 22 11 16 "Domestic Water Piping" for water meters.
3. Section 22 47 16 "Pressure Water Coolers" for water filters for water coolers.

1.02 ACTION SUBMITTALS

A. Refer to Section 013300 “Submittal Procedures.”

B. Product Data: For each type of product.

1.03 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.04 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS FOR PIPING SPECIALTIES

A. Potable-water piping and components shall comply with NSF 61.

2.02 PERFORMANCE REQUIREMENTS

A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig unless otherwise indicated.

2.03 VACUUM BREAKERS

A. Hose-Connection Vacuum Breakers:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Arrowhead Brass Products.
      b. Cash Acme; a division of Reliance Worldwide Corporation.
      c. Conbraco Industries, Inc.
      d. Legend Valve.
      e. MIFAB, Inc.
      f. Prier Products, Inc.
      g. Watts; a division of Watts Water Technologies, Inc.; Watts Regulator Company.
      h. Woodford Manufacturing Company; a division of WCM Industries, Inc.
      i. Zurn Industries, LLC; Plumbing Products Group; Light Commercial Products.
      j. Zurn Industries, LLC; Plumbing Products Group; Wilkins Water Control Products.
   2. Standard: ASSE 1011.
   3. Body: Bronze, nonremovable, with manual drain.
   4. Outlet Connection: Garden-hose threaded complying with ASME B1.20.7.
   5. Finish: Chrome or nickel plated.

2.04 BACKFLOW PREVENTERS

A. Reduced-Pressure-Principle Backflow Preventers.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Ames Fire & Waterworks; a division of Watts Water Technologies, Inc.
      b. Conbraco Industries, Inc.
      c. FEBCO; a division of Watts Water Technologies, Inc.
      d. Flomatic Corporation.
      e. Watts; a division of Watts Water Technologies, Inc.; Watts Regulator Company.
      f. Zurn Industries, LLC; Plumbing Products Group; Wilkins Water Control Products.
   2. Standard: ASSE 1013.
   3. Operation: Continuous-pressure applications.

4. Pressure Loss: 12 psig maximum, through middle third of flow range.
5. Body: Bronze for NPS 2 and smaller; cast iron with interior lining that complies with AWWA C550 or that is FDA approved for NPS 2-1/2 and larger.
6. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
7. Configuration: Designed for horizontal, straight-through flow.
8. Accessories:
   a. Valves NPS 2 and Smaller: Ball type with threaded ends on inlet and outlet.
   b. Valves NPS 2-1/2 and Larger: Outside-screw and yoke-gate type with flanged ends on inlet and outlet.
   c. Air-Gap Fitting: ASME A112.1.2, matching backflow-preventer connection.

B. Double-Check, Backflow-Prevention Assemblies:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Ames Fire & Waterworks; a division of Watts Water Technologies, Inc.
   b. Conbraco Industries, Inc.
   c. FEBCO; a division of Watts Water Technologies, Inc.
   d. Flomatic Corporation.
   e. Watts; a division of Watts Water Technologies, Inc.; Watts Regulator Company.
   f. Zurn Industries, LLC; Plumbing Products Group; Wilkins Water Control Products.
2. Standard: ASSE 1015.
3. Operation: Continuous-pressure applications unless otherwise indicated.
4. Pressure Loss: 5 psig maximum, through middle third of flow range.
5. Body: Bronze for NPS 2 and smaller; cast iron with interior lining that complies with AWWA C550 or that is FDA approved for NPS 2-1/2 and larger.
6. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
7. Configuration: Designed for horizontal, straight-through flow.
8. Accessories:
   a. Valves NPS 2 and Smaller: Ball type with threaded ends on inlet and outlet.
   b. Valves NPS 2-1/2 and Larger: Outside-screw and yoke-gate type with flanged ends on inlet and outlet.

2.05 BALANCING VALVES

A. Copper-Alloy Calibrated Balancing Valves:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Armstrong International, Inc.
   b. Flo Fab Inc.
   c. ITT Corporation; Bell & Gossett Div.
   d. NIBCO Inc.
   e. TAC.
   f. TACO Incorporated.
   g. Watts; a division of Watts Water Technologies, Inc.; Watts Regulator Company.

2. Type: Ball or Y-pattern globe valve with two readout ports and memory-setting indicator.
3. Body: Brass or bronze.
4. Size: Same as connected piping, but not larger than NPS 2.
5. Accessories: Meter hoses, fittings, valves, differential pressure meter, and carrying case.

2.06 STRAINERS FOR DOMESTIC WATER PIPING

A. Y-Pattern Strainers:
1. Pressure Rating: 125 psig minimum unless otherwise indicated.
2. Body: Bronze for NPS 2 and smaller; cast iron with interior lining that complies with AWWA C550 or that is FDA approved, epoxy coated and for NPS 2-1/2 and larger.
3. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
4. Screen: Stainless steel with round perforations unless otherwise indicated.
5. Perforation Size:
   a. Strainers NPS 2 and Smaller: 0.020 inch
   b. Strainers NPS 2-1/2 to NPS 4: 0.045 inch.
   c. Strainers NPS 5 and Larger: 0.10 inch
6. Drain: Factory-installed, hose-end drain valve.

2.07 HOSE BIBBS

A. Hose Bibbs:
1. Standard: ASME A112.18.1 for sediment faucets.
2. Body Material: Bronze.
3. Seat: Bronze, replaceable.
4. Supply Connections: NPS 1/2 or NPS 3/4 threaded or solder-joint inlet.
5. Outlet Connection: Garden-hose thread complying with ASME B1.20.7.
6. Pressure Rating: 125 psig.
7. Vacuum Breaker: Integral or field-installation, nonremovable, drainable, hose-connection vacuum breaker complying with ASSE 1011.
8. Finish for Equipment Rooms: Rough bronze, or chrome or nickel plated.
9. Finish for Service Areas: Rough bronze.
10. Finish for Finished Rooms: Chrome or nickel plated.
11. Operation for Equipment Rooms: Wheel handle or operating key.
12. Operation for Service Areas: Wheel handle.
13. Operation for Finished Rooms: Operating key.
14. Include operating key with each operating-key hose bibb.
15. Include integral wall flange with each chrome- or nickel-plated hose bibb.

2.08 WALL HYDRANTS

A. Nonfreeze Wall Hydrants:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Josam Company.
   b. Woodford Manufacturing Company; a division of WCM Industries, Inc.; model B67.
   c. Approved Equal.
2. Standard: ASME A112.21. 3M for concealed-outlet, self-draining wall hydrants.
3. Pressure Rating: 125 psig.
4. Operation: Loose key.
5. Casing and Operating Rod: Of length required to match wall thickness. Include wall clamp.
6. Inlet: NPS 3/4 or NPS 1.
7. Outlet: Concealed, with integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.
8. Box: Deep, flush mounted with cover.
9. Box and Cover Finish: Color as selected by Architect to match building.
10. Outlet: Concelaed, with integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.
11. Nozzle and Wall-Plate Finish: Polished nickel bronze.
12. Operating Keys(s): Two with each wall hydrant.

B. Moderate-Climate Wall Hydrants:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Josam Company.
   b. Woodford Manufacturing Company; a division of WCM Industries, Inc.
   c. Approved Equal.
2. Standard: ASME A112.21. 3M for concealed outlet, self-draining wall hydrants.
3. Pressure Rating: 125 psig.
4. Operation: Loose key.
5. Inlet: NPS 3/4 or NPS 1.
6. Outlet:
   a. Concealed, with integral vacuum breaker or nonremovable hose-connection vacuum breaker complying with ASSE 1011 or backflow preventer complying with ASSE 1052.
   b. Garden-hose thread complying with ASME B1.20.7.
7. Box: Deep, flush mounted with cover.
8. Box and Cover Finish: Color as selected by Architect to match building.
9. Nozzle and Wall-Plate Finish: Polished nickel bronze
10. Operating Keys(s): Two with each wall hydrant.

2.09 DRAIN VALVES

A. Ball-Valve-Type, Hose-End Drain Valves.

1. Standard: MSS SP-110 for standard-port, two-piece ball valves.
2. Pressure Rating: 400-psig minimum CWP.
3. Size: NPS 3/4.
4. Body: Copper alloy.
5. Ball: Chrome-plated brass.
6. Seats and Seals: Replaceable.
7. Handle: Vinyl-covered steel.
8. Inlet: Threaded or solder joint.
9. Outlet: Threaded, short nipple with garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

B. Stop-and-Waste Drain Valves:
1. Standard: MSS SP-110 for ball valves or MSS SP-80 for gate valves.
2. Pressure Rating: 200-psig minimum CWP or Class 125.
3. Size: NPS 3/4.
4. Body: Copper alloy or ASTM B 62 bronze.
5. Drain: NPS 1/8 side outlet with cap.

2.10 WATER-HAMMER ARRESTERS

A. Water-Hammer Arresters
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. AMTROL, Inc.
b. Josam Company.
c. MIFAB, Inc.
d. Precision Plumbing Products, Inc.
e. Sioux Chief Manufacturing Company, Inc.
f. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
g. Tyler Pipe; Wade Div.
h. Watts Drainage Products.
i. Zurn Industries, LLC; Plumbing Products Group; Specification Drainage Products.
2. Standard: ASSE 1010 or PDI-WH 201.
3. Type: Copper tube with piston].
4. Size: ASSE 1010, Sizes AA and A through F, or PDI-WH 201, Sizes A through F.

2.11 SPECIALTY VALVES

A. Comply with requirements for general-duty metal valves in Section 220523 "General-Duty Valves for Plumbing Piping."

2.12 FLEXIBLE CONNECTORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Flex-Hose Co., Inc.
2. Flexicraft Industries.
3. Flex Pression, Ltd.
4. Flex-Weld Incorporated.
5. Hyspan Precision Products, Inc.
6. Mercer Gasket & Shim, Inc.
7. Metraflex, Inc.
8. Proco Products, Inc.
9. TOZEN Corporation.
10. Unaflex.Universal Metal Hose; a Hyspan company.

B. Bronze-Hose Flexible Connectors: Corrugated-bronze tubing with bronze wire-braid covering and ends brazed to inner tubing.
1. Working-Pressure Rating: Minimum 200 psig.
2. End Connections NPS 2 and Smaller: Threaded copper pipe or plain-end copper tube.
3. End Connections NPS 2-1/2 and Larger: Flanged copper alloy.

C. Stainless-Steel-Hose Flexible Connectors: Corrugated-stainless-steel tubing with stainless-steel wire-braid covering and ends welded to inner tubing.
1. Working-Pressure Rating: Minimum 200 psig
2. End Connections NPS 2 and Smaller: Threaded steel-pipe nipple.
3. End Connections NPS 2-1/2 and Larger: Flanged steel nipple.

2.13 TEMPERATURE-ACTUATED, WATER MIXING VALVES

A. Water-Temperature Limiting Devices:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Armstrong International, Inc.
b. Cash Acme; a division of Reliance Worldwide Corporation.
c. Conbraco Industries, Inc.
d. Honeywell International Inc.
e. Legend Valve.
f. Leonard Valve Company.
g. Powers; a division of Watts Water Technologies, Inc.
h. Symmons Industries, Inc.
i. TACO Incorporated.
j. Watts; a division of Watts Water Technologies, Inc.; Watts Regulator Company.
k. Zurn Industries, LLC; Plumbing Products Group; Wilkins Water Control Products.
2. Standard: ASSE 1017.
3. Pressure Rating: 125 psig.
4. Type: Thermostatically controlled, water mixing valve.
5. Material: Bronze body with corrosion-resistant interior components.
6. Connections: Threaded inlets and outlet.

7. Accessories: Check stops on hot- and cold-water supplies, and adjustable, temperature-control handle.
8. Tempered-Water Setting: 110 deg F.
9. Tempered-Water Design Flow Rate: 0.5 gpm.
10. Valve Finish: Chrome plated.

B. Primary, Thermostatic, Water Mixing Valves:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Armstrong International, Inc.
b. Lawler Manufacturing Company, Inc.
c. Leonard Valve Company.
d. Powers; a division of Watts Water Technologies, Inc.
e. Symmons Industries, Inc.
2. Standard: ASSE 1017.
3. Pressure Rating: 125 psig minimum unless otherwise indicated.
4. Type: Exposed-mounted, thermostatically controlled, water mixing valve.
5. Material: Bronze body with corrosion-resistant interior components.
6. Connections: Union inlets and outlet.
7. Accessories: Manual temperature control, check stops on hot- and cold-water supplies, and adjustable, temperature-control handle.
8. Tempered-Water Setting: 110 deg F.
9. Valve Finish: Rough bronze.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install backflow preventers in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.
1. Locate backflow preventers in same room as connected equipment or system.
2. Install drain for backflow preventers with atmospheric-vent drain connection with air-gap fitting, fixed air-gap fitting, or equivalent positive pipe separation of at least two pipe diameters in drain piping and pipe-to-floor drain. Locate air-gap device attached to or under backflow preventer. Simple air breaks are unacceptable for this application.
3. Do not install bypass piping around backflow preventers.

B. Install balancing valves in locations where they can easily be adjusted.

C. Install Y-pattern strainers for water on supply side of each water pressure-reducing valve and pump.

D. Install water-hammer arresters in water piping according to PDI-WH 201.

E. Install supply-type, trap-seal primer valves with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.

F. Make provisions and install new water meter in accordance with requirements of the City of Newark water authority.

3.02 CONNECTIONS

A. Comply with requirements for ground equipment in Section 260526 "Grounding and Bonding for Electrical Systems."

B. Fire-retardant-treated-wood blocking is specified in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for electrical connections.

C. Connect digital recirculation valves to power per Division 16 requirements.

3.03 LABELING AND IDENTIFYING

A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:
1. Pressure vacuum breakers.
2. Reduced-pressure-principle backflow preventers.
3. Double-check, backflow-prevention assemblies.
4. Calibrated balancing valves.
5. Supply-type, trap-seal primer valves.

B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.04 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:
1. Test each pressure vacuum breaker, reduced-pressure-principle backflow preventer, double-check, and backflow-prevention assembly according to authorities having jurisdiction and the device's reference standard.

B. Domestic water piping specialties will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports.

3.05 ADJUSTING

A. Set field-adjustable flow set points of balancing valves.

END OF SECTION

SECTION 22 1123
DOMESTIC WATER PUMPS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General Conditions and other Division 1 Specification Sections, apply to the Work of this Section.

1.02 SUMMARY

A. Section Includes:

1. In-line, sealless centrifugal pumps.
2. Horizontally mounted, in-line, close-coupled centrifugal pumps.

1.03 DEFINITIONS

A. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include materials of construction, rated capacities, certified performance curves with operating points plotted on curves, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1.05 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For domestic water pumps to include in operation and maintenance manuals.

1.06 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. UL Compliance: Comply with UL 778 for motor-operated water pumps.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Retain shipping flange protective covers and protective coatings during storage.

B. Protect bearings and couplings against damage.

C. Comply with pump manufacturer's written rigging instructions for handling.

PART 2 - PRODUCTS

2.01 IN-LINE, SEALLESS CENTRIFUGAL PUMPS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Armstrong Pumps Inc.
2. Bell & Gossett Domestic Pump; ITT Corporation.
3. Grundfos Pumps Corp.
4. TACO Incorporated.

B. Description: Factory-assembled and -tested, in-line, close-coupled, canned-motor, sealless, overhung-impeller centrifugal pumps.

C. Pump Construction:

1. Pump and Motor Assembly: Hermetically sealed, replaceable-cartridge type with motor and impeller on common shaft and designed for installation with pump and motor shaft horizontal.
2. Casing: Bronze, with threaded or companion-flange connections.
3. Impeller: Plastic.
4. Motor: Single speed, unless otherwise indicated.

D. Capacities and Characteristics as scheduled on drawings.

2.02 HORIZONTALLY MOUNTED, IN-LINE, CLOSE-COUPLED CENTRIFUGAL PUMPS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Alyan Pump Co.
2. Armstrong Pumps Inc.
3. Bell & Gossett Domestic Pump; ITT Corporation.
4. Marshall Engineered Products Co.
5. PACO Pumps; Grundfos Pumps Corporation, U.S. A.
6. Pentair Pump Group; Aurora Pump.
7. TACO Incorporated.
8. Thrush Company, Inc.

B. Description: Factory-assembled and -tested, in-line, single-stage, close-coupled, overhung-impeller centrifugal pumps designed for installation with pump and motor shaft mounted horizontal.

C. Pump Construction:

1. Casing: Radially split with threaded companion-flange connections for pumps with NPS 2 (DN 50) pipe connections and flanged connections for pumps with NPS 2-1/2 (DN 65) pipe connections.
2. Impeller: Statically and dynamically balanced, closed, and keyed to shaft.
3. Shaft and Shaft Sleeve: Steel shaft with deflector, with copper-alloy shaft sleeve. Include water slinger on shaft between motor and seal.
4. Seal: Mechanical, with carbon-steel rotating ring, stainless-steel spring, ceramic seat, and rubber bellows and gasket.
5. Bearings: Oil-lubricated; bronze-journal or ball type.
6. Shaft Coupling: Flexible, capable of absorbing torsional vibration and shaft misalignment.

D. Motor: Single speed, with grease-lubricated ball bearings; and resiliently or rigidly mounted to pump casing.

E. Capacities and Characteristics: as scheduled on drawings.

2.03 MOTORS

A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 220513 "Common Motor Requirements for Plumbing Equipment."

1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

2.04 CONTROLS

A. Thermostats: Electric; adjustable for control of hot-water circulation pump.

1. Type: Water-immersion temperature sensor, for installation in piping.
2. Range: 65 to 200 deg F (18 to 93 deg C).
3. Enclosure: NEMA 250, Type 4X.
4. Operation of Pump: On or off.
5. Transformer: Provide if required.
6. Power Requirement: 120 V, ac.
7. Settings: Start pump at 105 deg F (41 deg C) and stop pump at 110 deg F (49 deg C).

B. Timers: Electric, for control of hot-water circulation pump.

1. Type: Programmable, seven-day clock with manual override on-off switch.
2. Enclosure: NEMA 250, Type 1, suitable for wall mounting.
3. Operation of Pump: On or off.
4. Transformer: Provide if required.

5. Power Requirement: 120-V ac.
6. Programmable Sequence of Operation: Up to two on-off cycles each day for seven days.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine roughing-in of domestic-water-piping system to verify actual locations of connections before pump installation.

3.02 PUMP INSTALLATION

A. Comply with HI 1.4.

B. Install in-line, sealless centrifugal pumps OR horizontally mounted, in-line, close-coupled centrifugal pumps for domestic hot water recirculation service.

C. Install in-line, sealless centrifugal pumps with shaft horizontal unless otherwise indicated.

D. Install horizontally mounted, in-line, close-coupled centrifugal pumps with shaft(s) horizontal.

E. Install continuous-thread hanger rods and of size required to support pump weight.

1. Comply with requirements for hangers and supports specified in Section 22 05 29 "Hangers and Supports for Plumbing Piping and Equipment."

F. Install thermostats in hot-water return piping.

G. Install timers on wall nearest to pump location.

3.03 CONNECTIONS

A. Comply with requirements for piping specified in Section 22 11 16 "Domestic Water Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to pumps to allow service and maintenance.

C. Connect domestic water piping to pumps. Install suction and discharge piping equal to or greater than size of pump nozzles.

1. Install flexible connectors adjacent to pumps in suction and discharge piping of the following pumps:

a. Horizontally mounted, in-line, close-coupled centrifugal pumps.

b. Comply with requirements for flexible connectors specified in Section 22 11 16 "Domestic Water Piping."

2. Install shutoff valve and strainer on suction side of each pump, and check, shutoff, and throttling valves on discharge side of each pump. Install valves same size as connected piping. Comply with requirements for valves specified in Section 22 05 23 "General-Duty Valves for Plumbing Piping" and comply with requirements for strainers specified in Section 22 11 19 "Domestic Water Piping Specialties."

3. Install pressure gage and snubber at suction of each pump and pressure gage and snubber at discharge of each pump. Install at integral pressure-gage tappings where provided or install pressure-gage connectors in suction and discharge piping around pumps. Comply with requirements for pressure gages and snubbers specified in Section 220519 "Meters and Gages for Plumbing Piping."

D. Connect thermostats, and timers to pumps that they control.

3.04 IDENTIFICATION

A. Comply with requirements for identification specified in Section 22 05 53 "Identification for Plumbing Piping and Equipment" for identification of pumps.

3.05 STARTUP SERVICE

A. Perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.
2. Check piping connections for tightness.
3. Clean strainers on suction piping.
4. Set thermostats, timers, for automatic starting and stopping operation of pumps.
5. Perform the following startup checks for each pump before starting:
   a. Verify bearing lubrication.
   b. Verify that pump is free to rotate by hand and that pump for handling hot liquid is free to rotate with pump hot and cold. If pump is bound or drags, do not operate until cause of trouble is determined and corrected.
   c. Verify that pump is rotating in the correct direction.
6. Prime pump by opening suction valves and closing drains, and prepare pump for operation.
7. Start motor.
8. Open discharge valve slowly.
9. Adjust temperature settings on thermostats.
10. Adjust timer settings.

3.06 ADJUSTING

A. Adjust domestic water pumps to function smoothly, and lubricate as recommended by manufacturer.

B. Adjust initial temperature set points.

C. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

END OF SECTION

SECTION 23 1126

FACILITY LIQUEFIED-PETROLEUM GAS PIPING

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes LPG distribution pipe, fittings, related components, and appurtenances that convey liquefied-petroleum gas (LPG) in its vapor phase from point of connection with existing or new storage container, or from utility service main to building service.

B. Products include the following:

1. Steel pipe and fittings.
2. CSST and fittings.
3. Copper tubing and fittings.
4. PE pipe, tubing, and fittings.
5. Mechanical couplings.
6. Piping specialties.
7. Valves.
8. Pressure regulators.
9. Dielectric fittings.
10. Storage containers.

1.02 DEFINITIONS

A. CSST: Corrugated stainless steel tubing.

B. CWP: Cold working pressure.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

E. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

F. LPG: Liquefied-petroleum gas.

G. PE: Polyethylene.

1.03 ACTION SUBMITTALS

A. Product Data: For each type of the following:

1. Piping specialties.
2. CSST with associated components.
3. Valves: Include pressure rating, capacity, settings, and electrical connection data of selected models.
4. Pressure Regulators: Indicate pressure ratings and capacities.
5. Dielectric fittings.
6. Storage containers.

1.04 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Plans and details, drawn to scale, on which LPG piping is indicated and coordinated with other installations, using input from installers of the items involved.

B. Site Survey: Plans, drawn to scale, on which LPG piping is shown and coordinated with other services and utilities.

C. Field Quality-Control Submittals:

1. Field quality-control reports.

D. Qualification Statements: For professional engineer.

1.05 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For LPG equipment and accessories.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Handling Flammable Liquids: Remove and dispose of liquids from existing LPG piping according to requirements of authorities having jurisdiction.

B. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

C. Store pipes and tubes with protective PE coating to avoid damaging coating and protect from direct sunlight.

D. Protect stored PE pipes, tubing, and valves from direct sunlight.

1.07 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided.

B. Coordinate requirements for access panels and doors for valves installed concealed behind finished surfaces. Comply with requirements in Division 08, "Access Doors and Frames."

PART 2 - PRODUCTS

2.01 SOURCE LIMITATIONS

A. Obtain each product type from single source from single manufacturer.

2.02 PERFORMANCE REQUIREMENTS

A. Comply with requirements of NFPA 58, and, NFPA 54, and , the International Fuel Gas Code for LPG distribution system, including materials, installation, and testing.

B. Comply with requirements of authorities having jurisdiction.

C. Comply with requirements of utility company supplying LPG.

D. Minimum Operating-Pressure Ratings:

1. Minimum Operating Pressure for Piping and Valves: 125 psig unless otherwise indicated.

2. Minimum Operating Pressure of Service Meter: 10 psig.

E. LPG System Pressure within Buildings:

1. System Pressure within Buildings, One Pressure Range: 0.5 psig or less.

F. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

2.03 PIPE, TUBING, AND FITTINGS

A. Steel Pipe and Fittings:

1. Steel Pipe: ASTM A53/A53M black steel, Schedules 40 and 80, Type E or S, Grade B.

2. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern.

3. Wrought-Steel Welding Fittings: ASTM A234/A234M for butt welding and socket welding.

4. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends.

5. Forged-Steel Flanges and Flanged Fittings: ASME B16.5, minimum Class 150, including bolts, nuts, and gaskets of the following material group, end connections, and facings:

    a. Material Group: 1.1.

    b. End Connections: Threaded or butt welding to match pipe.

    c. Lapped Face: Not permitted underground.

    d. Gasket Materials: ASME B16.20, metallic, flat, asbestos free, aluminum o-rings, and spiral-wound metal gaskets.

    e. Bolts and Nuts: ASME B18.2.1, carbon steel aboveground, and stainless-steel underground.

6. Protective Coating for Underground Piping: Factory-applied, three-layer coating of epoxy, adhesive, and PE.

    a. Joint Cover Kits: Epoxy paint, adhesive, and heat-shrink PE sleeves.

B. CSST and Fittings:

1. CSST:

    a. Standard: ANSI LC 1/CSA 6.26.

    b. Tubing: ASTM A240/A240M, corrugated, Series 300 stainless steel.

    c. Jacket - Electrically Insulative and UV-Resistant Polymer with Flame Retardant:

        1) Surface-Burning Characteristics: As determined by testing identical products in accordance with ASTM E84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

            a) Flame-Spread Index: 25 or less.

            b) Smoke-Developed Index: 50 or less.

2. Fittings: Copper-alloy mechanical fittings with ends made to fit and listed for use with CSST and suitable for metal-to-metal seal without gaskets. Include brazing socket or threaded ends complying with ASME B1.20.1.

3. Striker Plates: Steel, designed to protect tubing from penetrations.

4. Manifolds: Malleable iron or steel with factory-applied protective coating. Threaded connections are to comply with ASME B1.20.1 for pipe inlet and corrugated tubing outlets.

5. Operating-Pressure Rating: 25 psig.

C. Copper Tubing and Fittings:

1. Drawn-Temper Copper Tube: ASTM B88, Type L.
2. Annealed-Temper Copper Tube: ASTM B88, Type K.
3. Copper Fittings: ASME B16.22, wrought copper, and streamlined pattern.
4. Bronze Flanges and Flanged Fittings: ASME B16.24, Class 150.
    a. Gasket Material: ASME B16.20, metallic, flat, asbestos-free, aluminum o-rings and spiral-wound metal gaskets.
5. Bolts and Nuts: ASME B18.2.1, carbon steel or stainless steel.
6. Flare Fittings: ASME B16.26 and SAE J513.
    a. Copper fittings with long nuts.
    b. Metal-to-metal compression seal without gasket.
    c. Dryseal threads complying with ASME B1.20.3.
7. Protective Coating for Underground Tubing: Factory-applied, extruded PE a minimum of 0.022 inch thick.

D. PE Pipe, Tubing, and Fittings:

1. PE Pipe and Tubing: ASTM D2513, SDR 11.
2. PE Fittings: ASTM D2683, socket-fusion type or ASTM D3261, butt-fusion type.
3. PE Transition Fittings: Factory-fabricated fittings with PE pipe complying with ASTM D2513, SDR 11, and steel pipe complying with ASTM A53/A53M, black steel, Schedule 40, Type E or S, Grade B.
4. Transition Service-Line Risers: Factory fabricated and leak tested.
    a. Underground Portion: PE pipe complying with ASTM D2513, SDR 11 inlet connected to steel pipe complying with ASTM A53/A53M, Schedule 40, Type E or S, Grade B, with corrosion-protective coating for aboveground outlet.
    b. Outlet is to be threaded or flanged or suitable for welded connection.
    c. Bridging sleeve over mechanical coupling.
    d. Factory-connected anode.
    e. Tracer wire connection.
    f. Ultraviolet shield.
    g. Stake supports with factory finish to match steel pipe casing or carrier pipe.

2.04 COUPLINGS

A. Plastic Mechanical Couplings, NPS 1-1/2 and Smaller:

1. Standard: ASTM D2513.
2. PE body.
3. Elastomeric seals.
4. Independent gripping collets.
5. Couplings are suitable for joining PE pipe to PE pipe.

B. Plastic Mechanical Couplings, NPS 2 and Larger:

1. Standard: ASTM D2513.
2. Plastic body.
3. Body tube.
4. Seals.
5. Collets.
6. Stainless steel bolts, nuts, and washers.
7. Couplings are to be suitable for joining PE pipe to PE pipe, or steel pipe to PE pipe.

C. Steel Mechanical Couplings:

1. [Stainless steel] [Steel] flanges and tube with epoxy finish.
2. Buna-nitrile seals.
3. [Stainless steel] [Steel] bolts, washers, and nuts.
4. Factory-installed anode for steel-body couplings installed underground.
5. Couplings are to be suitable for joining plain-end PE pipe to PE pipe, steel pipe to PE pipe, or steel pipe to steel pipe.

2.05 PIPING SPECIALTIES

A. Flexible Piping Joints:

1. Approved for LPG service.
2. Stainless steel bellows with woven, flexible, bronze, wire-reinforcing protective jacket.
3. Minimum working pressure of 250 psig and 250 deg F operating temperature.
4. Flanged- or threaded-end connections to match equipment connected and to be capable of minimum 3/4-inch misalignment.

5. Maximum 36-inch length for liquid LPG lines.

B. Appliance Flexible Connectors:

1. Indoor, Fixed-Appliance Flexible Connectors: ANSI Z21.24.
2. Indoor, Movable-Appliance Flexible Connectors: ANSI Z21.69.
3. Outdoor, Appliance Flexible Connectors: ANSI Z21.75.
4. CSST with polymer coating.
5. Operating-Pressure Rating: 0.5 psig.
6. End Fittings: Zinc-coated steel.
7. Threaded Ends: ASME B1.20.1.
8. Maximum Length: 72 inches.

C. Quick-Disconnect Devices:

1. Standard: ANSI Z21.41/CSA 6.9.
2. Copper-alloy convenience outlet and matching plug connector.
3. Nitrile seals.
4. Hand operated with automatic shutoff when disconnected.
5. For indoor or outdoor applications.
6. Adjustable, retractable restraining cable.

D. Y-Pattern Strainers:

1. Body: ASTM A126, Class B, cast iron with bolted cover and bottom drain connection.
2. End Connections: Threaded ends for NPS 2 and smaller; flanged ends for NPS 2-1/2 and larger.
3. Strainer Screen: [40] [60]-mesh startup strainer and perforated stainless steel basket with 50 percent free area.
4. CWP Rating: 125 psig.

2.06 JOINING MATERIALS

A. Joint Compound and Tape: Suitable for LPG.

B. Welding Filler Metals: AWS D10.12/D10.12M.

C. Brazing Filler Metals: AWS A5.8/A5.8M alloy with melting point greater than 1000 deg F.

2.07 MANUAL GAS SHUTOFF VALVES

A. Manual Gas Shutoff Valves - Metallic:

1. Description: Metallic ball valve or metallic plug valve of type indicated in schedules under Part 3.
2. Standards:
    a. ANSI Z21.15/CSA 9.1.
    b. ASME B16.33.
    c. ASME B16.44.
    d. ANSI LC 4/CSA 6.32.
3. System Pressure Rating: 0.5 psig or less.
4. End Connections:
    a. Threaded Ends: ASME B1.20.1.
    b. Dryseal Threads on Flare Ends: ASME B1.20.3.
    c. Flanged Ends: ASME B16.5 for steel flanges.

2.08 PRESSURE REGULATORS

A. Service Pressure Regulators:

1. Standards:
    a. NFPA 58.
    b. ANSI Z21.80/CSA 6.22.
2. Single-port, self-contained regulator with orifice no larger than required at maximum pressure inlet and no pressure-sensing piping external to the regulator.
3. Pressure regulator is to maintain discharge pressure-setting downstream and is not to exceed 150 percent of design discharge pressure at shutoff.
4. Maximum Inlet Pressure: 100 psig.
5. Maximum Outlet Pressure: 10 psig.
6. End Connections: Threaded for regulators NPS 2 and smaller; flanged for regulators NPS 2-1/2 and larger.
7. Overpressure Protection Device: Factory mounted on pressure regulator.

8. Atmospheric Vent: Factory- or field-installed, stainless steel screen in opening if not connected to vent piping.

B. Line-Pressure Regulators:

1. Standards:

a. NFPA 58.

b. ANSI Z21.80/CSA 6.22.

2. Single-port, self-contained regulator with orifice no larger than required at maximum pressure inlet and no pressure-sensing piping external to the regulator.

3. Pressure regulator is to maintain discharge pressure-setting downstream and is not exceed 150 percent of design discharge pressure at shutoff.

4. Maximum Inlet Pressure: 10 psig.

5. Maximum Outlet Pressure: 2 psig.

6. End Connections: Threaded for regulators NPS 2 and smaller; flanged for regulators NPS 2-1/2 and larger.

7. Overpressure Protection Device: Factory mounted on pressure regulator.

8. Atmospheric Vent: Factory- or field-installed, stainless steel screen in opening if not connected to vent piping.

C. Appliance Pressure Regulators:

1. Standards:

a. NFPA 58.

b. ANSI Z21.18/CSA 6.3.

2. Regulator may include vent-limiting device, instead of vent connection, if approved by authorities having jurisdiction.

3. Maximum Inlet Pressure: 2 psig

4. Maximum Outlet Pressure: 1 psig.

5. End Connections: Threaded for regulators NPS 2 and smaller; flanged for regulators NPS 2-1/2 and larger.

2.09 DIELECTRIC FITTINGS

A. Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

B. Dielectric Unions:

1. Standard: ASSE 1079.
2. Pressure Rating: 125 psig minimum at 180 deg F.
3. End Connections: Solder-joint copper alloy and threaded ferrous.

C. Dielectric Flanges:

1. Standard: ASSE 1079.
2. Factory-fabricated, bolted, companion-flange assembly.
3. Pressure Rating: 125 psig minimum at 180 deg F.
4. End Connections: Solder-joint copper alloy and threaded ferrous; threaded copper alloy and threaded ferrous.

D. Dielectric-Flange Insulating Kits:

1. Nonconducting materials for field assembly of companion flanges.
2. Pressure Rating: 150 psig
3. Gasket: Neoprene or phenolic.
4. Bolt Sleeves: Phenolic or PE.
5. Washers: Phenolic with steel backing washers.

2.10 STORAGE CONTAINERS

A. Description: Factory-designed, -fabricated, and -tested containers.

B. Standards:

1. NFPA 58.
2. ASME BPVC-VIII-1.
3. UL 125.
4. UL 842.
5. Department of Transportation (DOT) Regulations.

C. Provide all appurtenances as required by NFPA 58, qualified to UL 125:

1. Vapor-shutoff valve.
2. Liquid-shutoff valve.
3. Pressure-relief valve.
4. Fixed maximum liquid level gauge.
5. Filler valve.

6. Overfilling protection device.
7. Actuated liquid withdrawal excess-flow valve.
8. Provide container appurtenances with a minimum service pressure rating of 250 psig.Provide exposed metal surfaces mechanically cleaned, primed, and painted for resistance to corrosion for outdoor installation.

E. Provide ladders for access to valves more than 72 inches aboveground.

F. Stainless Steel Nameplate: Attach to aboveground storage container or to adjacent structure for underground storage container.

1. Name and address of supplier or trade name of container.
2. Water capacity in gallons and liters.
3. Design pressure in psig and kPa.
    a. Statement: "This container does not contain a product having a vapor pressure in excess of “Insert maximum pressure in psig at 100 deg F
    b. Outside surface area in square feet and square meters.
    c. Year of manufacture.
    d. Shell thickness in inches and millimeters.
    e. Overall length in feet and meters.
    f. OD in feet and meters.
    g. Manufacturer's serial number.
    h. ASME code label.
4. Felt support pads and two concrete or painted-steel saddles per storage container. Corrosion protection required at container-to-felt contact.
5. Straps and anchors for tie-down slab.
6. Asphalt-based coating for corrosion protection.
7. Container connections and valves protected in manway at top of storage container.
8. Manway equipped with ventilation louvers.

2.11 DETECTABLE WARNING TAPE

A. Acid- and alkali-resistant PE film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored yellow.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine roughing-in for LPG piping system to verify actual locations of piping connections before equipment installation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 EARTHWORK

A. Comply with requirements in Division 31, "Earth Moving" for excavating, trenching, and backfilling.

3.03 PREPARATION

A. Close equipment-shutoff valves before turning off LPG to premises or piping section.

B. Inspect LPG piping in accordance with code(s) and authority having jurisdiction to determine that LPG utilization devices are turned off in piping section affected.

C. Comply with requirements of code(s) and authority having jurisdiction for prevention of accidental ignition.

3.04 INSTALLATION OF OUTDOOR PIPING

A. Comply with code and authority having jurisdiction requirements for installation and purging of LPG piping.

B. Install underground, LPG piping buried a minimum of [12 inches] <Insert dimension> below finished grade. Comply with requirements in Division 31, "Earth Moving" for excavating, trenching, and backfilling.

C. Steel Piping with Protective Coating:

1. Apply joint cover kits to pipe after joining to cover, seal, and protect joints.

2. Replace pipe having damaged PE coating with new pipe.

D. Copper Tubing with Protective Coating:

1. Apply joint cover kits over tubing to cover, seal, and protect joints.

2. Repair damage to PE coating on pipe as recommended in writing by protective coating manufacturer.

E. Install fittings for changes in direction and branch connections.

F. Joints for connection to inlets and outlets on vaporizers, regulators, and valves may be flanged or threaded to match the equipment.

G. Install pressure gauge downstream from each service regulator. Pressure gauges are specified in Division 23, "Meters and Gauges for HVAC Piping."

3.05 INSTALLATION OF INDOOR PIPING

A. Comply with requirements of the code(s) and authority having jurisdiction for installation and purging of LPG piping.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

C. Arrange for pipe spaces, chases, slots, sleeves, and openings in building structure during progress of construction.

D. Install piping in concealed locations unless otherwise indicated. Piping in equipment rooms and service areas may be installed exposed. Piping is not to be installed in inaccessible locations.

1. Conceal piping in walls, pipe spaces, utility spaces, above ceilings, below grade or floors, and in floor channels unless indicated to be exposed to view.

2. Except as specified below, install concealed piping and piping installed under the building in containment conduit constructed of steel pipe with welded joints, as described in Part 2. Install a vent pipe from containment conduit to outdoors and terminate with weatherproof vent cap.

a. Above Accessible Ceilings: Piping, fittings, valves, and regulators may be installed in accessible spaces without containment conduit.

1) Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

b. In Floors: Install piping with welded or brazed joints and protective coating in cast-in-place concrete floors. Cover piping to be cast in concrete slabs with minimum of 1-1/2 inches of concrete. Piping may not be in physical contact with other metallic structures, such as reinforcing rods or electrically neutral conductors. Do not embed piping in concrete slabs containing quick-set additives or cinder aggregate.

c. In Floor Channels: Channels must have cover and be open to space above cover for ventilation.

d. In Walls or Partitions: Protect piping installed inside partitions or hollow walls from physical damage using steel striker barriers at rigid supports.

1) Exception: Piping passing through partitions or walls does not require striker barriers.

e. Prohibited Locations:

1) Do not install piping in or through circulating air ducts, clothes or trash chutes, chimneys, or gas vents (flues), ventilating ducts, or dumbwaiter or elevator shafts.

2) Do not install piping in return-air plenums.

3) Do not install piping in solid walls or partitions.

f. Under the Building: Install in vented containment conduit or CSST with integral vented sleeve and associated fittings.

E. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

F. Locate valves for easy access from a standing position.

G. Install LPG piping at uniform grade of 2 percent down toward drip and sediment traps.

H. Install piping free of sags and bends.

I. Install fittings for changes in direction and branch connections.

J. Comply with requirements in Sections specifying gas-fired appliances and equipment, and verify final appliance and equipment locations for roughing-in.

K. Drips and Sediment Traps: Install drips at points where condensate may collect, including service-meter outlets. Locate where readily accessible to permit cleaning and emptying. Do not install where condensate is subject to freezing.

1. Construct drips and sediment traps using tee fitting with bottom outlet plugged or capped. Use nipple a minimum length of three pipe diameters, but not less than 3 inches long and same size as connected pipe. Install with space below bottom of drip to remove plug or cap.

L. Extend relief vent connections for service regulators, line regulators, and overpressure protection devices to outdoors, and terminate with weatherproof vent cap.

M. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.

N. Connect branch piping from top or side of horizontal piping.

O. Install unions in pipes NPS 2 and smaller, adjacent to each valve, at final connection to each piece of equipment. Unions are not required at flanged connections.

P. Do not use LPG piping as grounding electrode.

Q. Install strainer on inlet of each line-pressure regulator and automatic or electrically operated valve.

R. Install pressure gauge downstream from each line regulator. Pressure gauges are specified in Division 23, "Meters and Gauges for Plumbing Piping."

S. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Division 23, "Sleeves and Sleeve Seals for HVAC Piping."

T. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Division 23, "Sleeves and Sleeve Seals for HVAC Piping."

U. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Division 23, "Escutcheons for HVAC Piping."

3.06 INSTALLATION OF VALVES

A. Install manual gas shutoff valve for each gas appliance ahead of CSST, aluminum, or copper connector.

B. Install underground valves with valve boxes.

C. Install regulators and overpressure protection devices with maintenance access space adequate for servicing and testing.

D. Install earthquake valves aboveground outside buildings according to listing.

E. Install anode for metallic valves in underground PE piping.

F. Do not install valves in return-air plenums.

3.07 PIPING JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Threaded Joints:

1. Thread pipe with tapered pipe threads complying with ASME B1.20.1.
2. Cut threads full and clean using sharp dies.
3. Ream threaded pipe ends to remove burrs and restore full ID of pipe.
4. Apply appropriate tape or thread compound to external pipe threads unless dryseal threading is specified.
5. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

D. Brazed Joints: Construct joints in accordance with AWS's "Brazing Handbook," Ch. 22, "Pipe and Tube."

E. Flanged Joints: Install gasket material, size, type, and thickness appropriate for LPG service. Install gasket concentrically positioned.

F. Flared Joints: Cut tubing with roll cutting tool. Flare tube end with tool to result in flare dimensions complying with SAE J513. Tighten finger tight, then use wrench. Do not overtighten.

G. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join in accordance with ASTM D2657.

1. Plain-End Pipe and Fittings: Use butt fusion.

2. Plain-End Pipe and Socket Fittings: Use socket fusion.

3.08 PIPING CONNECTIONS

A. Install LPG piping electrically continuous and bonded to gas appliance equipment grounding conductor of the circuit powering the appliance in accordance with NFPA 70.

B. Install piping adjacent to appliances to allow service and maintenance of appliances.

C. Connect piping to appliances using manual gas-shutoff valves and unions. Install valve within 72 inches of each gas-fired appliances and equipment. Install union between valve and appliances or equipment.

3.09 INSTALLATION OF STORAGE CONTAINER

A. Do not install storage containers in a pit.

B. Fill storage container to at least 80 percent capacity with [butane] [propane].

C. Install piping connections with swing joints or flexible connectors to allow for storage container settlement and for thermal expansion and contraction.

D. Ground containers in accordance with NFPA 780. Grounding is specified in Division 26, "Lightning Protection for Structures."

E. Set storage container on concrete ballast base large enough to offset buoyancy of empty storage container immersed in water.

F. Install tie-down straps over container anchored in ballast base, and repair damaged coating.

G. Backfill with a minimum coverage for underground or mounded storage containers in accordance with NFPA 58.

H. Backfill with pea gravel as required in Division 31, "Earth Moving."

I. Install cathodic protection for storage container. Cathodic protection is specified in Division 13, "Cathodic Protection."

3.10 INSTALLATION OF LABELING AND IDENTIFICATION

A. Comply with requirements in Division 23, "Identification for HVAC Piping and Equipment" for piping and valve identification.

B. Install detectable warning tape directly above gas piping, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

C. Label and identify gas piping and pressure outside a multitenant building by tenant.

3.11 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Comply with requirements of the code(s) and authority having jurisdiction for testing, inspection, and purging of LPG installation.

B. LPG installation will be considered defective if it does not pass tests and inspections. Defective products are to be replaced.

C. Prepare test and inspection reports.

3.12 OUTDOOR PIPING SCHEDULE

A. Underground piping is to be one of the following:

1. PE pipe, tubing, and fittings joined by heat-fusion, or mechanical couplings; service-line risers with tracer wire terminated in an accessible location.

2. Containment Conduit: Schedule 40, steel pipe with wrought-steel fittings and welded joints. Coat pipe and fittings with protective coating for steel piping.

B. Aboveground piping is to be one of the following:

1. Schedule 40, steel pipe with malleable-iron fittings and threaded joints.

2. Schedule 40, steel pipe with wrought-steel fittings and welded joints, or mechanical couplings.

3.13 INDOOR PIPING SCHEDULE FOR SYSTEM PRESSURES LESS THAN 0.5 PSIG

A. Aboveground piping is to be one of the following:

1. CSST and fittings.

2. Annealed-temper copper tube with wrought-copper fittings and [brazed] [flared] joints.

3. Schedule 40, steel pipe with malleable-iron fittings and threaded joints.

4. Schedule 40, steel pipe with wrought-steel fittings and welded joints.

5. Drawn-temper copper tube, Type L with wrought-copper fittings and brazed joints.

3.14 UNDERGROUND MANUAL GAS SHUTOFF VALVE SCHEDULE

A. Connections to Existing Gas Piping: Use valve and fitting assemblies made for tapping utility's gas mains and listed by an NRTL.

B. Underground Vapor Piping:

1. PE valves.
2. NPS 2 and Smaller: Bronze, lubricated plug valves.
3. NPS 2-1/2 and Larger: Cast-iron, lubricated plug valves.

3.15 ABOVEGROUND MANUAL GAS SHUTOFF VALVE SCHEDULE

A. Valves for pipe NPS 2 and smaller is to be one of the following:

1. One-piece, bronze ball valve with bronze trim.
2. Two-piece, full-port, bronze ball valves with bronze trim.
3. Bronze plug valve.

B. Valves for pipe NPS 2-1/2 and larger is to be one of the following:

1. Two-piece, full-port, bronze ball valves with bronze trim.
2. Bronze plug valve.
3. Cast-iron, lubricated plug valve.

END OF SECTION

SECTION 22 1316

SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General Conditions and other Division 1 Specification Sections, apply to the Work of this Section.

1.02 SUMMARY

A. Section Includes:

1. Pipe, tube, and fittings.
2. Specialty pipe fittings.

1.03 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:

1. Soil, Waste, and Vent Piping: 10-foot head of water.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.05 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF/ANSI 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic5 drain, waste, and vent piping and "NSF-sewer" for plastic sewer piping.

1.06 PROJECT CONDITIONS

A. Interruption of Existing Sanitary Waste Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1. Notify Owner no fewer than two calendar days in advance of proposed interruption of sanitary waste service.

2. Do not proceed with interruption of sanitary waste service without Owner's written permission.

PART 2 - PRODUCTS

2.01 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.02 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings: ASTM A 74, Service and Extra Heavy class(es).

B. Gaskets: ASTM C 564, rubber.

C. Calking Materials: ASTM B 29, pure lead and oakum or hemp fiber.

2.03 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings: ASTM A 888 or CISPI 301.

B. CISPI, Hubless-Piping Couplings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. ANACO-Husky.
    b. Dallas Specialty & Mfg. Co.
    c. Fernco Inc.
    d. Matco-Norca, Inc.
    e. MIFAB, Inc.
    f. Mission Rubber Company; a division of MCP Industries, Inc.
    g. Stant.
    h. Tyler Pipe.
2. Standards: ASTM C 1277 and CISPI 310.
3. Description: Stainless-steel corrugated shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

C. Heavy-Duty, Hubless-Piping Couplings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. ANACO-Husky.
    b. Clamp-All Corp.
    c. Dallas Specialty & Mfg. Co.

d. MIFAB, Inc.

e. Mission Rubber Company; a division of MCP Industries, Inc.

f. Stant.

g. Tyler Pipe.

2. Standards: ASTM C 1277 and ASTM C 1540.

3. Description: Stainless-steel shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

D. Cast-Iron, Hubless-Piping Couplings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. MG Piping Products Company.

2. Standard: ASTM C 1277.

3. Description: Two-piece ASTM A 48/A 48M, cast-iron housing; stainless-steel bolts and nuts; and ASTM C 564, rubber sleeve with integral, center pipe stop.

2.04 GALVANIZED-STEEL PIPE AND FITTINGS

A. Galvanized-Steel Pipe: ASTM A 53/A 53M, Type E, Standard Weight class. Include square-cut-grooved or threaded ends matching joining method.

B. Galvanized-Cast-Iron Drainage Fittings: ASME B16.12, threaded.

C. Steel Pipe Pressure Fittings:

1. Galvanized-Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106/A 106M, Schedule 40, seamless steel pipe. Include ends matching joining method.

2. Malleable-Iron Unions: ASME B16.39; Class 150; hexagonal-stock body with ball-and-socket, metal-to-metal, bronze seating surface; and female threaded ends.

3. Galvanized-Gray-Iron, Threaded Fittings: ASME B16.4, Class 125, standard pattern.

2.05 COPPER TUBE AND FITTINGS

A. Copper DWV Tube: ASTM B 306, drainage tube, drawn temper.

B. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings.

C. Hard Copper Tube: ASTM B 88, Type L and Type M (ASTM B 88M, Type B and Type C), water tube, drawn temper.

D. Soft Copper Tube: ASTM B 88, Type L (ASTM B 88M, Type B), water tube, annealed temper.

E. Copper Pressure Fittings:

1. Copper Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
2. Copper Unions: MSS SP-123, copper-alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

F. Solder: ASTM B 32, lead free with ASTM B 813, water-flushable flux.

2.06 PVC PIPE AND FITTINGS

A. Solid-Wall PVC Pipe: ASTM D 2665, drain, waste, and vent.

B. PVC Socket Fittings: ASTM D 2665, made to ASTM D 3311, drain, waste, and vent patterns and to fit Schedule 40 pipe.

C. Adhesive Primer: ASTM F 656.

1. Adhesive primer shall have a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

D. Solvent Cement: ASTM D 2564.

1. PVC solvent cement shall have a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.07 SPECIALTY PIPE FITTINGS

A. Transition Couplings:

1. General Requirements: Fitting or device for joining piping with small differences in OD's or of different materials. Include end connections same size as and compatible with pipes to be joined.
2. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
3. Unshielded, Nonpressure Transition Couplings:
    a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
        1) Dallas Specialty & Mfg. Co.
        2) Fernco Inc.
        3) Mission Rubber Company; a division of MCP Industries, Inc.
        4) Plastic Oddities; a division of Diverse Corporate Technologies, Inc.
    b. Standard: ASTM C 1173.
    c. Description: Elastomeric, sleeve-type, reducing or transition pattern. Include shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.
    d. Sleeve Materials:
        1) For Cast-Iron Soil Pipes: ASTM C 564, rubber.

2) For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.

3) For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

4. Shielded, Nonpressure Transition Couplings:

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1) Cascade Waterworks Mfg. Co.

2) Mission Rubber Company; a division of MCP Industries, Inc.

b. Standard: ASTM C 1460.

c. Description: Elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.

B. Dielectric Fittings:

1. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

2. Dielectric Flanges:

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1) Capitol Manufacturing Company.

2) Central Plastics Company.

3) Matco-Norca, Inc.

4) Watts Regulator Co.; a division of Watts Water Technologies, Inc.

5) Wilkins; a Zurn company.

b. Description:

1) Standard: ASSE 1079.

2) Factory-fabricated, bolted, companion-flange assembly.

3) Pressure Rating: 125 psig (860 kPa) minimum at 180 deg F (82 deg C).

4) End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

3. Dielectric-Flange Insulating Kits:

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1) Advance Products & Systems, Inc.

2) Calpico, Inc.

3) Central Plastics Company.

4) Pipeline Seal and Insulator, Inc.

b. Description:

1) Nonconducting materials for field assembly of companion flanges.

2) Pressure Rating: 150 psig (1035 kPa).

3) Gasket: Neoprene or phenolic.

4) Bolt Sleeves: Phenolic or polyethylene.

5) Washers: Phenolic with steel backing washers.

4. Dielectric Nipples:

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1) Elster Perfection.

2) Grinnell Mechanical Products.

3) Matco-Norca, Inc.

4) Precision Plumbing Products, Inc.

5) Victaulic Company.

b. Description:

1) Standard: IAPMO PS 66

2) Electroplated steel nipple.

3) Pressure Rating: 300 psig (2070 kPa) at 225 deg F (107 deg C).

4) End Connections: Male threaded or grooved.

5) Lining: Inert and noncorrosive, propylene.

PART 3 - EXECUTION

3.01 EARTH MOVING

A. Comply with requirements for excavating, trenching, and backfilling specified in Section 31 20 00 "Earth Moving."

3.02 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping to permit valve servicing.

F. Install piping at indicated slopes.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Install piping to allow application of insulation.

J. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

K. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.

L. Install soil and waste drainage and vent piping at the following minimum slopes unless otherwise indicated:

1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 and smaller; 2 percent downward in direction of flow for piping NPS 4 and larger.
2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.

M. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

N. Install steel piping according to applicable plumbing code.

O. Install aboveground copper tubing according to CDA's "Copper Tube Handbook."

P. Install underground PVC piping according to ASTM D 2321.

Q. Install engineered soil and waste drainage and vent piping systems as follows:

1. Combination Waste and Vent: Comply with standards of authorities having jurisdiction.
2. Reduced-Size Venting: Comply with standards of authorities having jurisdiction.

R. Plumbing Specialties:

1. Install backwater valves in sanitary waster gravity-flow piping. Comply with requirements for backwater valves specified in Section 22 13 19 "Sanitary Waste Piping Specialties."
2. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary drainage gravity-flow piping. Install cleanout fitting with closure plug inside the building in sanitary drainage force-main piping. Comply with requirements for cleanouts specified in Section 22 13 19 "Sanitary Waste Piping Specialties."
3. Install drains in sanitary drainage gravity-flow piping. Comply with requirements for drains specified in Section 22 13 19 "Sanitary Waste Piping Specialties."

S. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

T. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."

U. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 22 05 17 "Sleeves and Sleeve Seals for Plumbing Piping."

V. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

3.03 JOINT CONSTRUCTION

A. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.

B. Join hub-and-spigot, cast-iron soil piping with calked joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead-and-oakum calked joints.

C. Join hubless, cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.

D. Couplings and fittings shall be installed so that they are not permanently enclosed within a partition.

E. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

F. Join copper tube and fittings with soldered joints according to ASTM B 828. Use ASTM B 813, water-flushable, lead-free flux and ASTM B 32, lead-free-alloy solder.

G. Plastic, Nonpressure-Piping, Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
2. PVC Piping: Join according to ASTM D 2855 and ASTM D 2665 Appendixes.

H. Flanged Joints: Align bolt holes. Select appropriate gasket material, size, type, and thickness. Install gasket concentrically positioned. Use suitable lubricants on bolt threads. Torque bolts in cross pattern.

3.04 SPECIALTY PIPE FITTING INSTALLATION

A. Transition Couplings:
1. Install transition couplings at joints of piping with small differences in OD's.
2. In Drainage Piping: Shielded, nonpressure transition couplings.

B. Dielectric Fittings:
1. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
2. Dielectric Fittings for NPS 2 and Smaller: Use dielectric nipples.
3. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flange kits.
4. Dielectric Fittings for NPS 5 and Larger: Use dielectric flange kits.

3.05 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements for pipe hanger and support devices and installation specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
1. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.
2. Install carbon-steel pipe support clamps for vertical piping in noncorrosive environments.
3. Vertical Piping: MSS Type 8 or Type 42, clamps.
4. Install individual, straight, horizontal piping runs:
a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.
5. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
6. Base of Vertical Piping: MSS Type 52, spring hangers.

B. Support horizontal piping and tubing within 12 inches of each fitting and coupling.

C. Support vertical piping and tubing at base and at each floor.

D. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.

E. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:
1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.

2. NPS 3: 60 inches with 1/2-inch rod.
3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
4. NPS 6 and NPS 8: 60 inches with 3/4-inch rod.
5. NPS 10 and NPS 12: 60 inches with 7/8-inch rod.
6. Spacing for 10-foot lengths may be increased to 10 feet. Spacing for fittings is limited to 60 inches.

F. Install supports for vertical cast-iron soil piping every 15 feet.

G. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/4: 84 inches with 3/8-inch rod.
2. NPS 1-1/2: 108 inches with 3/8-inch rod.
3. NPS 2: 10 feet with 3/8-inch rod.
4. NPS 2-1/2: 11 feet with 1/2-inch rod.
5. NPS 3: 12 feet with 1/2-inch rod.
6. NPS 4 and NPS 5: 12 feet with 5/8-inch rod.
7. NPS 6 and NPS 8: 12 feet with 3/4-inch rod.
8. NPS 10 and NPS 12: 12 feet with 7/8-inch rod.

H. Install supports for vertical steel piping every 15 feet.

I. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/4: 72 inches with 3/8-inch rod.
2. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
3. NPS 2-1/2: 108 inches with 1/2-inch rod.
4. NPS 3 and NPS 5: 10 feet with 1/2-inch rod.
5. NPS 6: 10 feet with 5/8-inch rod.
6. NPS 8: 10 feet with 3/4-inch rod.

J. Install supports for vertical copper tubing every 10 feet.

K. Install hangers for PVC piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 and NPS 2: 48 inches with 3/8-inch rod.
2. NPS 3: 48 inches with 1/2-inch rod.
3. NPS 4 and NPS 5: 48 inches with 5/8-inch rod.
4. NPS 6 and NPS 8: 48 inches with 3/4-inch rod.

L. Install supports for vertical PVC piping every 48 inches.

M. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.06 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.

C. Connect drainage and vent piping to the following:

1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.
2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.
4. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.
5. Comply with requirements for cleanouts and drains specified in Section 221319 "Sanitary Waste Piping Specialties."
6. Equipment: Connect drainage piping as indicated. Provide shutoff valve if indicated and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 and larger.

D. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.

E. Make connections according to the following unless otherwise indicated:

1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.

3.07 IDENTIFICATION

A. Identify exposed sanitary waste and vent piping. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.08 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.

2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.

2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.

3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping except outside leaders on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.

4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg. Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.

5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.

6. Prepare reports for tests and required corrective action.

3.09 CLEANING AND PROTECTION

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

3.10 PIPING SCHEDULE

A. Flanges and unions may be used on aboveground pressure piping unless otherwise indicated.

B. Aboveground, soil and waste piping NPS 4 and smaller shall be any of the following:

1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.
3. Galvanized-steel pipe, drainage fittings, and threaded joints.
4. Copper DWV tube, copper drainage fittings, and soldered joints.
5. Dissimilar Pipe-Material Couplings: Shielded nonpressure transition couplings.

C. Aboveground, soil and waste piping NPS 5 and larger shall be any of the following:
1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless, cast-iron soil pipe and fittings; heavy-duty hubless-piping couplings; and coupled joints.
3. Galvanized-steel pipe, drainage fittings, and threaded joints.
4. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

D. Aboveground, vent piping NPS 4 and smaller shall be the following:
1. (ADD 2) Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
2. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

E. Aboveground, vent piping NPS 5 and larger shall be the following:
1. Solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
2. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

F. Underground, soil, waste, and vent piping NPS 4 and smaller shall be the following:
1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.
3. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

G. Underground, soil and waste piping NPS 5 and larger shall be any of the following:
1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
2. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.
3. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

H. Trap Primer piping NPS 1/2 and larger shall be the following:
1. Copper DWV tube, copper drainage fittings, and soldered joints.
2. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

END OF SECTION

SECTION 22 1319

SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General Conditions and other Division 1 Specification Sections, apply to the Work of this Section.

1.02 SUMMARY

A. Section Includes:

1. Cleanouts.
2. Floor drains.
3. Roof flashing assemblies.
4. Miscellaneous sanitary drainage piping specialties.
5. Flashing materials.
6. Trap-seal protection devices.
7. Air Admittance Valve
8. Grease Interceptor

B. Related Requirements:

1. Section 33 41 00 "Storm Utility Drainage Piping" for storm draining piping and piping specialties outside the building.

1.03 DEFINITIONS

A. ABS: Acrylonitrile-butadiene-styrene plastic.

B. FOG: Fats, oils, and greases.

C. FRP: Fiberglass-reinforced plastic.

D. HDPE: High-density polyethylene plastic.

E. PE: Polyethylene plastic.

F. PP: Polypropylene plastic.

G. PVC: Polyvinyl chloride plastic.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.05 INFORMATIONAL SUBMITTALS

A. Field quality-control test reports.

1.06 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For drainage piping specialties to include in emergency, operation, and maintenance manuals.

1.07 QUALITY ASSURANCE

A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic sanitary piping specialty components.

1.08 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 3.

B. Coordinate size and location of roof penetrations.

PART 2 - PRODUCTS

2.01 CLEANOUTS

A. Exposed Metal Cleanouts CO:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Josam Company; Josam Div.; Series 58900.
    b. MIFAB, Inc.
    c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
    d. Tyler Pipe; Wade Div.
    e. Watts Drainage Products Inc.
    f. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.36.2M for cast iron for cleanout test tee.
3. Body or Ferrule Material: Cast iron.
4. Clamping Device: Required.
5. Outlet Connection: Threaded.

6. Closure: Brass plug with straight threads and gasket.
7. Adjustable Housing Material: Cast iron with threads.

B. Metal Floor Cleanouts FCO:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Josam Company; Josam Div.; Series 56000.
   b. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
   c. Tyler Pipe; Wade Div.
   d. Watts Drainage Products Inc.
   e. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.36.2M for adjustable housing cleanout.
3. Size: Same as connected branch.
4. Type: Adjustable housing.
5. Body or Ferrule: Cast iron.
6. Clamping Device: Required.
7. Outlet Connection: Inside calk.
8. Closure: Brass plug with straight threads and gasket.
9. Adjustable Housing Material: Cast iron with threads.
10. Frame and Cover Material and Finish: Nickel-bronze, copper alloy.
11. Frame and Cover Shape: Round.
12. Top Loading Classification: Medium Duty.
13. Riser: ASTM A 74, Service class, cast-iron drainage pipe fitting and riser to cleanout.

C. Wall Cleanouts WCO:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Josam Company; Josam Div.; Series 58600.
   b. MIFAB, Inc.
   c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
   d. Tyler Pipe; Wade Div.
   e. Watts Drainage Products Inc.
   f. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.36.2M. Include wall access.
3. Size: Same as connected drainage piping.
4. Body: Hubless, cast-iron soil pipe test tee as required to match connected piping.
5. Closure: Countersunk or raised-head plug.

6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
7. Wall Access: Round, flat, chrome-plated brass or stainless-steel cover plate with screw.

2.02 FLOOR DRAINS

A. Cast-Iron Floor Drains FD-1:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Josam Company; Josam Div.;.
   b. MIFAB, Inc.
   c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
   d. Tyler Pipe; Wade Div.
   e. Watts Drainage Products Inc; model FD-100-A
   f. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.6.3.
3. Pattern: Floor drain.
4. Body Material: Gray iron.
5. Seepage Flange: Required for elevated floors.
6. Anchor Flange: Required.
7. Clamping Device: Required.
8. Outlet: Bottom.
9. Coating on Interior and Exposed Exterior Surfaces: Not required.
10. Sediment Bucket: Not required.
11. Top or Strainer Material: Nickel bronze.
12. Top of Body and Strainer Finish: Nickel bronze.
13. Top Shape: Round.
14. Dimensions of Top or Strainer: 5”.
15. Top Loading Classification: Medium Duty.
16. Funnel: Not required.
17. Inlet Fitting: Gray iron, with threaded inlet and threaded or spigot outlet, and trap-seal primer valve connection.
18. Trap Material: Cast iron.
19. Trap Pattern: Deep-seal P-trap.
20. Trap Features: Trap-seal primer valve drain connection.

2.03 FLOOR SINKS

A. Cast-Iron Floor Sinks FS-1:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Josam Company; Josam Div.;.
    b. MIFAB, Inc.
    c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
    d. Tyler Pipe; Wade Div.
    e. Watts Drainage Products Inc; model FS-740.
    f. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.6.7.
3. Pattern: Floor drain.
4. Body Material: Cast iron.
5. Anchor Flange: Required, with seepage holes.
6. Clamping Device: Required for elevated floors.
7. Outlet: Bottom, no-hub connection.
8. Coating on Interior Surfaces: Acid-resistant enamel.
9. Sediment Bucket: Required.
10. Internal Strainer: Dome.
11. Internal Strainer Material: Aluminum
12. Top Grate Material: Bronze, loose.
13. Top of Body and Grate Finish: Nickel bronze.
14. Top Shape: Square.
15. Dimensions of Top Grate: 8”.
16. Top Loading Classification: Light duty.
17. Funnel: Not required.

2.04 ROOF FLASHING ASSEMBLIES

A. Roof Flashing Assemblies:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Acorn Engineering Company; Elmdor/Stoneman Div.
    b. Thaler Metal Industries Ltd.

B. Description: Manufactured assembly made of 4.0-lb/sq. ft. (20-kg/sq. m), 0.0625-inch- (1.6-mm) hick, lead flashing collar and skirt extending at least 6 inches (150 mm) rom pipe, with galvanized-steel boot reinforcement and counterflashing fitting.

2.05 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES

A. Open Drains:

1. Description: Shop or field fabricate from ASTM A 74, Service class, hub-and-spigot, cast-iron, soil-pipe fittings. Include P-trap, hub-and-spigot riser section; and where required, increaser fitting joined with ASTM C 564, rubber gaskets.
2. Size: Same as connected waste piping with increaser fitting of size indicated.

B. Deep-Seal Traps:

1. Description: Cast-iron or bronze casting, with inlet and outlet matching connected piping and cleanout trap-seal primer valve connection.
2. Size: Same as connected waste piping.
   a. NPS 2 (DN 50): 4-inch- (100-mm-) minimum water seal.
   b. NPS 2-1/2 (DN 65) and Larger: 5-inch- (125-mm-) minimum water seal.

C. Floor-Drain, Trap-Seal Primer Fittings:

1. Description: Cast iron, with threaded inlet and threaded or spigot outlet, and trap-seal primer valve connection.
2. Size: Same as floor drain outlet with NPS 1/2 (DN 15) side inlet.

D. Air-Gap Fittings:

1. Standard: ASME A112.1.2, for fitting designed to ensure fixed, positive air gap between installed inlet and outlet piping.
2. Body: Bronze or cast iron.
3. Inlet: Opening in top of body.
4. Outlet: Larger than inlet.
5. Size: Same as connected waste piping and with inlet large enough for associated indirect waste piping.

2.06 FLASHING MATERIALS

A. Lead Sheet: ASTM B 749, Type L51121, copper bearing, with the following minimum weights and thicknesses, unless otherwise indicated:

1. General Use: 4.0-lb/sq. ft. (20-kg/sq. m), 0.0625-inch (1.6-mm) thickness.
2. Vent Pipe Flashing: 3.0-lb/sq. ft. (15-kg/sq. m), 0.0469-inch (1.2-mm) thickness.
3. Burning: 6-lb/sq. ft. (30-kg/sq. m), 0.0938-inch (2.4-mm) thickness.

B. Copper Sheet: ASTM B 152/B 152M, of the following minimum weights and thicknesses, unless otherwise indicated:

1. General Applications: 12 oz./sq. ft. (3.7 kg/sq. m or 0.41-mm thickness).
2. Vent Pipe Flashing: 8 oz./sq. ft. (2.5 kg/sq. m or 0.27-mm thickness).

C. Zinc-Coated Steel Sheet: ASTM A 653/A 653M, with 0.20 percent copper content and 0.04-inch (1.01-mm) minimum thickness, unless otherwise indicated. Include G90 (Z275) hot-dip galvanized, mill-phosphatized finish for painting if indicated.

D. Elastic Membrane Sheet: ASTM D 4068, flexible, chlorinated polyethylene, 40-mil (1.01-mm) minimum thickness.

E. Fasteners: Metal compatible with material and substrate being fastened.

F. Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.

G. Solder: ASTM B 32, lead-free alloy.

H. Bituminous Coating: SSPC-Paint 12, solvent-type, bituminous mastic.

2.07 GREASE INTERCEPTORS

A. Grease Interceptors:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    a. Applied Chemical Technology, Incorporated.
    b. Josam Company; Josam Div.
    c. MIFAB, Inc.
    d. Rockford Sanitary Systems, Inc.
    e. Schier Products Company; model GB-75 (basis of design).
    f. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
    g. Tyler Pipe; Wade Div.
    h. Watts Drainage Products Inc.
    i. Zurn Plumbing Products Group; Light Commercial Operation.
    j. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASME A112.14.3 and PDI-G101, for intercepting and retaining fats, oils, and greases from food-preparation wastewater.
3. Plumbing and Drainage Institute Seal: Required.
4. Body Material: Pastic.
5. Body Dimensions: 47” x 33” x 40”.
6. Body Extension: As required.
7. Flow Rate: 50 gpm.
8. Grease Retention Capacity: 861 lbs.
9. Inlet and Outlet Size: 4”.
10. End Connections: Hub.

11. Cleanout: Integral or field installed on outlet.
12. Mounting: Recessed, flush with floor.
13. Flow-Control Fitting: Required.
14. Operation: Manual cleaning.

2.08 MANHOLE RISERS

A. Manhole Frames and Covers: Ferrous; 24-inch ID by 7- to 9-inch riser with 4-inch-minimum-width flange and 26-inch-diameter cover.
   1. Ductile Iron: ASTM A536, Grade 60-40-18, unless otherwise indicated.
   2. Gray Iron: ASTM A48/A48M, Class 35, unless otherwise indicated.
   3. Include indented top design with lettering cast into cover, using wording equivalent to the following:
      a. Grease Interceptors in Sanitary Sewerage System: "GREASE INTERCEPTOR."

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:
   1. Size same as drainage piping up to NPS 4 (DN 100). Use NPS 4 (DN 100) for larger drainage piping unless larger cleanout is indicated.
   2. Locate at each change in direction of piping greater than 45 degrees.
   3. Locate at minimum intervals of 50 feet (15 m) for piping NPS 4 (DN 100) and smaller and 100 feet (30 m) for larger piping.
   4. Locate at base of each vertical soil and waste stack.

B. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.

C. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.

D. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.
   1. Position floor drains for easy access and maintenance.
   2. Set floor drains below elevation of surrounding finished floor to allow floor drainage. Set with grates depressed according to the following drainage area radii:
      a. Radius, 30 Inches (750 mm) or Less: Equivalent to 1 percent slope, but not less than 1/4-inch (6.35-mm) total depression.
      b. Radius, 30 to 60 Inches (750 to 1500 mm): Equivalent to 1 percent slope.

c. Radius, 60 Inches (1500 mm) or Larger: Equivalent to 1 percent slope, but not greater than 1-inch (25-mm) total depression.

3. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.

4. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.

E. Install roof flashing assemblies on sanitary stack vents and vent stacks that extend through roof.

F. Install flashing fittings on sanitary stack vents and vent stacks that extend through roof.

G. Install deep-seal traps on floor drains and other waste outlets, if indicated.

H. Install floor-drain, trap-seal primer fittings on inlet to floor drains that require trap-seal primer connection.

1. Exception: Fitting may be omitted if trap has trap-seal primer connection.

2. Size: Same as floor drain inlet.

I. Install sleeve flashing device with each riser and stack passing through floors with waterproof membrane.

J. Install wood-blocking reinforcement for wall-mounting-type specialties.

K. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.

3.02 CONNECTIONS

A. Comply with requirements in Section 22 13 16 "Sanitary Waste and Vent Piping" for piping installation requirements. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment to allow service and maintenance.

3.03 FLASHING INSTALLATION

A. Fabricate flashing from single piece unless large pans, sumps, or other drainage shapes are required. Join flashing according to the following if required:

1. Lead Sheets: Burn joints of lead sheets 6.0-lb/sq. ft. (30-kg/sq. m), 0.0938-inch (2.4-mm) thickness or thicker. Solder joints of lead sheets 4.0-lb/sq. ft. (20-kg/sq. m), 0.0625-inch (1.6-mm) thickness or thinner.

2. Copper Sheets: Solder joints of copper sheets.

B. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.

1. Pipe Flashing: Sleeve type, matching pipe size, with minimum length of 10 inches (250 mm), and skirt or flange extending at least 8 inches (200 mm) around pipe.
2. Sleeve Flashing: Flat sheet, with skirt or flange extending at least 8 inches (200 mm) around sleeve.
3. Embedded Specialty Flashing: Flat sheet, with skirt or flange extending at least 8 inches (200 mm) around specialty.

C. Set flashing on floors and roofs in solid coating of bituminous cement.

D. Secure flashing into sleeve and specialty clamping ring or device.

E. Install flashing for piping passing through roofs with counterflashing or commercially made flashing fittings, according to Section 076200 "Sheet Metal Flashing and Trim."

F. Extend flashing up vent pipe passing through roofs and turn down into pipe, or secure flashing into cast-iron sleeve having calking recess.

G. Fabricate and install flashing and pans, sumps, and other drainage shapes.

3.04 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.05 PROTECTION

A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.

B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION

SECTION 22 3400

FUEL-FIRED DOMESTIC WATER HEATERS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following fuel-fired water heaters:

1. Commercial, gas-fired, high-efficiency, storage, domestic-water heaters.
2. Water heater accessories.

1.02 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Commercial domestic-water heaters shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

1.03 SUBMITTALS

A. Refer to Section 013300 “Submittal Procedures.”

B. Product Data: For each type and size of water heater indicated. Include rated capacities, operating characteristics, furnished specialties, and accessories.

C. Shop Drawings: Diagram power, signal, and control wiring.

D. Seismic Qualification Certificates: For fuel-fired, domestic-water heaters, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

E. Product Certificates: For each type of commercial water heater, signed by product manufacturer.

F. Source quality-control test reports.

G. Field quality-control test reports.

H. Operation and Maintenance Data: For water heaters to include in emergency, operation, and maintenance manuals.

I. Warranty: Special warranty specified in this Section.

1.04 QUALITY ASSURANCE

A. Source Limitations: Obtain same type of water heaters through one source from a single manufacturer.

B. Product Options: Drawings indicate size, profiles, and dimensional requirements of water heaters and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. ASME Compliance:

1. Where ASME-code construction is indicated, fabricate and label commercial water heater storage tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

2. Where ASME-code construction is indicated, fabricate and label commercial, finned-tube water heaters to comply with ASME Boiler and Pressure Vessel Code: Section IV.

E. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9" for all components that will be in contact with potable water.

1.05 COORDINATION

A. Coordinate size and location of concrete bases with Architectural and Structural Drawings.

1.06 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of fuel-fired water heaters that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including storage tank and supports.

b. Faulty operation of controls.

c. Deterioration of metals, metal finishes, and other materials beyond normal use.

2. Warranty Period(s): From date of Substantial Completion:

a. Commercial, Gas Water Heaters:

1) Controls and Other Components: Three years.

PART 2 - PRODUCTS

2.01 COMMERCIAL, GAS-FIRED, STORAGE, DOMESTIC-WATER HEATERS

A. Commercial, Gas-Fired, High-Efficiency, Storage, Domestic-Water Heaters:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following
    a. Bradford White Corporation.
    b. Lochinvar Corporation.
    c. PVI Industries, LLC.
    d. RBI Water Heaters; a Mestek company.
    e. Rheem Manufacturing Company.
    f. Smith, A. O. Water Products Co.; a division of A. O. Smith Corporation.
    g. State Industries.
    h. Weben-Jarco, Inc.
2. Standard: ANSI Z21.10.3/CSA 4.3.
3. Description: Manufacturer's proprietary design to provide at least 95 percent combustion efficiency at optimum operating conditions.
4. Storage-Tank Construction: ASME-code steel with 150-psig (1035-kPa) minimum working-pressure rating.
    a. Tappings: Factory fabricated of materials compatible with tank. Attach tappings to tank before testing.
        1) NPS 2 (DN 50) and Smaller: Threaded ends according to ASME B1.20.1.
        2) NPS 2-1/2 (DN 65) and Larger: Flanged ends according to ASME B16.5 for steel and stainless-steel flanges and according to ASME B16.24 for copper and copper-alloy flanges.
    b. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.
5. Factory-Installed Storage-Tank Appurtenances:
    a. Anode Rod: Replaceable magnesium.
    b. Dip Tube: Required unless cold-water inlet is near bottom of tank.
    c. Drain Valve: Corrosion-resistant metal complying with ASSE 1005.
    d. Insulation: Comply with ASHRAE/IESNA 90.1. Surround entire storage tank except connections and controls.
    e. Jacket: Steel with enameled finish.
    f. Burner or Heat Exchanger: Comply with UL 795 or approved testing agency requirements for gas-fired, high-efficiency, domestic-water heaters and natural-gas fuel.
    g. Temperature Control: Adjustable thermostat.
    h. Safety Controls: Automatic, high-temperature-limit and low-water cutoff devices or systems.
    i. Combination Temperature-and-Pressure Relief Valves: ANSI Z21.22/CSA 4.4-M. Include one or more relief valves with total relieving capacity at least as great as

heat input, and include pressure setting less than domestic-water heater working-pressure rating. Select one relief valve with sensing element that extends into storage tank.

B. Capacity and Characteristics:

1. Capacity:

a. See water heater schedule on drawings for capacities and characteristics.

2. Minimum Vent Diameter: 3 inches.

2.02 WATER HEATER ACCESSORIES

A. Gas Shutoff Valves: ANSI Z21.15/CGA 9.1, manually operated. Furnish for installation in piping.

B. Gas Pressure Regulators: ANSI Z21.18, appliance type. Include pressure rating, capacity, and pressure differential required between gas supply and water heater.

C. Gas Automatic Valves: ANSI Z21.21, appliance, electrically operated, on-off automatic valve.

D. Combination Temperature and Pressure Relief Valves: Include relieving capacity at least as great as heat input, and include pressure setting less than water heater working-pressure rating. Select each relief valve with sensing element that extends into storage tank.

1. Gas Water Heaters: ANSI Z21.22/CSA 4.4.

E. Drain Pans: Corrosion-resistant metal with raised edge. Provide dimensions not less than base of water heater and include drain outlet not less than NPS 3/4.

2.03 SOURCE QUALITY CONTROL

A. Test and inspect water heater storage tanks, specified to be ASME-code construction, according to ASME Boiler and Pressure Vessel Code.

B. Hydrostatically test commercial water heater storage tanks before shipment to minimum of one and one-half times pressure rating.

C. Prepare test reports.

PART 3 - EXECUTION

3.01 WATER HEATER INSTALLATION

A. Install water heaters level and plumb, according to layout drawings, original design, and referenced standards. Maintain manufacturer's recommended clearances. Arrange units so controls and devices needing service are accessible.

B. Install gas water heaters according to NFPA 54.

C. Install gas shutoff valves on gas supplies to gas water heaters without shutoff valves.

D. Install gas pressure regulators on gas supplies to gas water heaters without gas pressure regulators if gas pressure regulators are required to reduce gas pressure at burner.

E. Install automatic gas valves on gas supplies to gas water heaters, if required for operation of safety control.

F. Install commercial domestic-water heaters with seismic-restraint devices. Comply with requirements for seismic-restraint devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."

G. Install combination temperature and pressure relief valves in water piping for water heaters without storage. Extend commercial-water-heater relief-valve outlet, with drain piping same as domestic water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.

H. Install water heater drain piping as indirect waste to spill by positive air gap into open drains or over floor drains. Install hose-end drain valves at low points in water piping for water heaters that do not have tank drains. Refer to Division 22 Section "Plumbing Specialties" for hose-end drain valves.

I. Install thermometer on outlet piping of water heaters. Refer to Division 22 Section "Plumbing Meters" for thermometers.

J. Install piping-type heat traps on inlet and outlet piping of water heater storage tanks without integral or fitting-type heat traps.

K. Fill water heaters with water.

L. Provide vent piping per manufacturer’s requirements.

3.02 CONNECTIONS

A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to water heaters to allow service and maintenance. Arrange piping for easy removal of water heaters.

C. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

D. Connect wiring according to Division 26 Section "Low Voltage Electrical Power Conductors and Cables."

3.03 FIELD QUALITY CONTROL

A. Refer to Section 014000 “Quality Requirements” for independent field testing and inspection requirements, and requirements for monitoring quality of specified product installations.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.

C. Perform the following field tests and inspections and prepare test reports:

1. Leak Test: After installation, test for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, confirm proper operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Remove and replace water heaters that do not pass tests and inspections and retest as specified above.

3.04 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain commercial water heaters. Refer to Division 1 Section "Closeout Procedures."

END OF SECTION

SECTION 22 4200
COMMERCIAL PLUMBING FIXTURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General Conditions and other Division 1 Specification Sections, apply to the Work of this Section.

1.02 SUMMARY

A. This Section includes the following conventional plumbing fixtures and related components:

1. Faucets for lavatories and sinks.
2. Flushometers.
3. Toilet seats.
4. Protective shielding guards.
5. Fixture supports.
6. Water closets.
7. Lavatories.
8. Showers.
9. Service basins.
10. Bath Tubs.

1.03 DEFINITIONS

A. ABS: Acrylonitrile-butadiene-styrene plastic.

B. Accessible Fixture: Plumbing fixture that can be approached, entered, and used by people with disabilities.

C. Cast Polymer: Cast-filled-polymer-plastic material. This material includes cultured-marble and solid-surface materials.

D. Cultured Marble: Cast-filled-polymer-plastic material with surface coating.

E. Fitting: Device that controls the flow of water into or out of the plumbing fixture. Fittings specified in this Section include supplies and stops, faucets and spouts, shower heads and tub spouts, drains and tailpieces, and traps and waste pipes. Piping and general-duty valves are included where indicated.

F. FRP: Fiberglass-reinforced plastic.

G. PMMA: Polymethyl methacrylate (acrylic) plastic.

H. PVC: Polyvinyl chloride plastic.

I. Solid Surface: Nonporous, homogeneous, cast-polymer-plastic material with heat-, impact-, scratch-, and stain-resistance qualities.

1.04 SUBMITTALS

A. Product Data: For each type of plumbing fixture indicated. Include selected fixture and trim, fittings, accessories, appliances, appurtenances, equipment, and supports. Indicate materials and finishes, dimensions, construction details, and flow-control rates.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Operation and Maintenance Data: For plumbing fixtures to include in emergency, operation, and maintenance manuals.

D. Warranty: Special warranty specified in this Section.

1.05 QUALITY ASSURANCE

A. Source Limitations: Obtain plumbing fixtures, faucets, and other components of each category through one source from a single manufacturer.

1. Exception: If fixtures, faucets, or other components are not available from a single manufacturer, obtain similar products from other manufacturers specified for that category.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities"; Public Law 90-480, "Architectural Barriers Act"; and Public Law 101-336, "Americans with Disabilities Act"; for plumbing fixtures for people with disabilities.

D. Regulatory Requirements: Comply with requirements in Public Law 102-486, "Energy Policy Act," about water flow and consumption rates for plumbing fixtures.

E. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.

F. Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible.

G. Comply with the following applicable standards and other requirements specified for plumbing fixtures:

1. Vitreous-China Fixtures: ASME A112.19.2M.

H. Comply with the following applicable standards and other requirements specified for lavatory and sink faucets:

1. Backflow Protection Devices for Faucets with Hose-Thread Outlet: ASME A112.18.3M.

2. Faucets: ASME A112.18.1.

3. Hose-Connection Vacuum Breakers: ASSE 1011.
4. Hose-Coupling Threads: ASME B1.20.7.
5. Integral, Atmospheric Vacuum Breakers: ASSE 1001.
6. NSF Potable-Water Materials: NSF 61.
7. Pipe Threads: ASME B1.20.1.
8. Sensor-Actuated Faucets and Electrical Devices: UL 1951.
9. Supply Fittings: ASME A112.18.1.

I. Comply with the following applicable standards and other requirements specified for miscellaneous fittings:
1. Atmospheric Vacuum Breakers: ASSE 1001.
2. Brass and Copper Supplies: ASME A112.18.1.
3. Dishwasher Air-Gap Fittings: ASSE 1021.
4. Manual-Operation Flushometers: ASSE 1037.
5. Sensor-Operation Flushometers: ASSE 1037 and UL 1951.

J. Comply with the following applicable standards and other requirements specified for miscellaneous components:
1. Flexible Water Connectors: ASME A112.18.6.
2. Floor Drains: ASME A112.6.3.
3. Hose-Coupling Threads: ASME B1.20.7.
4. Off-Floor Fixture Supports: ASME A112.6.1M.
5. Pipe Threads: ASME B1.20.1.
6. Plastic Toilet Seats: ANSI Z124.5.
7. Supply and Drain Protective Shielding Guards: ICC A117.1.

PART 2 - PRODUCTS

2.01 LAVATORY FAUCETS

A. Sensor Lavatory Faucet (Public Restroom), LF-1: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture holes and outlet with spout and fixture receptor.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. American Standard
b. Chicago Faucets; model 116.976.AB.1
c. Kohler.
d. Moen.

e. Sloan Valve Co.

2. Maximum Flow Rate: 0.5 gpm, unless otherwise indicated.
3. Body Material: Copper or brass underbody with brass cover plate.
4. Finish: Polished chrome plate.
5. Type: Gooseneck, sensor.
6. Centers: 4 inches.
7. Mounting: Deck, exposed.
8. Handle(s): Not applicable.
9. Inlet(s): NPS 3/8 tubing with NPS 1/2 male adapter.
10. Spout: Rigid.
11. Spout Outlet: Non aerating spray..
12. Operation: Automatic with infra-red sensor.
13. Drain: Grid.
14. Tempering Device: Below deck mechanical mixing valve.
15. Power: Battery/self-sustaining power system.

2.02 SINK FAUCETS

A. Sink Faucet, SF-1: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture holes and outlet with spout and fixture receptor.

1. Available Manufacturers:
   a. American Standard
   b. Chicago Faucets, model 897-CP.
   c. Kohler.
   d. Moen.
   e. Sloan.
2. Maximum Flow Rate: 2.5 gpm (9.5 L/min.), unless otherwise indicated.
3. Body Material: Cast brass.
4. Finish: Chrome plate.
5. Type: Service sink faucet with stops in shanks, vacuum breaker, hose-thread outlet and pail hook.
6. Mixing Valve: 2-lever handle.
7. Centers: 8”.
8. Mounting: Back/wall, exposed.
9. Handles: Lever handle.
10. Inlets: NPS 1/2 (DN 15) female shank.

11. Spout: Rigid, cast with wall brace.
12. Spout Outlet: Hose thread.
13. Vacuum Breaker: Required.
14. Operation: Compression, manual.

B. Sink Faucet, SF-2: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture holes and outlet with spout and fixture receptor.

1. Manufacturers: Subject to compliance with requirements, provide products by f the manufacturer specified:
    a. Elkay, model LK1000CR.
    b. Kohler.
    c. Approved Equal.
2. Maximum Flow Rate: 1.5 gpm, unless otherwise indicated.
3. Body Material: Metal
4. Finish: Polished chrome plate.
5. Type: Swing spout.
6. Mixing Valve: One piece, self-contained ceramic disc valve.
7. Centers: Three hole, 4” centers..
8. Mounting: Deck, exposed.
9. Handles: Single lever handle mounted on spout.
10. Inlet(s): NPS 3/8 tubing with NPS 1/2 male adapter.
11. Spout: 8” swing spout.
12. Spout Outlet: Pull-down, three function spray head with spray, aerated stream and pause settings
13. Operation: Manual touch control for stream-to-spray water flow.
14. Drain: Strainer baskets.

2.03 FLUSHOMETER VALVES

A. Dual Flush Flushometer, FV-1: Cast-brass body with corrosion-resistant internal components, non-hold-open feature, control stop with check valve, vacuum breaker and copper or brass tubing and polished chrome-plated finish on exposed parts.

1. Available Manufacturers:
    a. Sloan Valve Co.; model 8111-1.28.
    b. Approved Equal.
2. Internal Design: Diaphragm operation.
3. Style: Exposed.

4. Inlet Size: NPS 1 (DN 25).
5. Trip Mechanism: Battery, electric-sensor actuator.
6. Consumption: Dual flush 1.28 gal./flush cycle.
7. Tailpiece Size: NPS 1-1/2 (DN 40) and standard length to top of bowl.
8. Manual Override: Required.
9. ADA Compliant: Required.
10. Courtesy Flush: Required.

B. Flushometer, FV-2: Cast-brass body with corrosion-resistant internal components, non-hold-open feature, control stop with check valve, vacuum breaker and copper or brass tubing and polished chrome-plated finish on exposed parts.

1. Available Manufacturers:
   a. Sloan Valve Co.; model 8186-0.125.
   b. Approved Equal.
2. Internal Design: Diaphragm operation.
3. Style: Exposed.
4. Inlet Size: NPS 3/4” (DN 20).
5. Trip Mechanism: Battery, electric-sensor actuator.
6. Consumption: 0.125 gal/flush.
7. Tailpiece Size: NPS 3/4” (DN 20) and standard length to top of bowl.
8. Manual Override: Required.
9. ADA Compliant: Required.
10. Courtesy Flush: Required.

2.04 TOILET SEATS

A. Toilet Seat, TS-1: Solid plastic.

1. Manufacturers: Subject to compliance with requirements, provide products by 1 of the manufacturers specified:
   a. Beneke.
   b. Bemis.
   c. Church.
2. Configuration: Open front without cover.
3. Size: Elongated.
4. Class: Standard commercial.
5. Hinge Type: SC, self-sustaining, check.
6. Color: White.

2.05 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Guard, PSG-1: Manufactured, plastic covering for hot- and cold-water supplies and trap and drain piping and complying with ADA requirements.

1. Available Manufacturers:

a. Truebro.

b. Buckaroo Soft Guard.

c. Plumberex X4333.

2.06 FIXTURE SUPPORTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified:

1. Josam Co.

2. Smith, Jay R. Mfg. Co.

3. Tyler Pipe, Wade Div.

4. Zurn Specifications Drainage Operation.

B. Water-Closet Support, WCS-1: Water-closet combination carrier designed for accessible and/or standard mounting height. Include single or double, vertical or horizontal, hub-and-spigot or hubless waste fitting as required for piping arrangement; faceplates; couplings with gaskets; feet; and fixture bolts and hardware matching fixture. Include additional extension coupling, faceplate and feet for installation in wide pipe space.

C. Lavatory Supports, LS-1:

1. Description: Type II, lavatory carrier with concealed arms and tie rod for wall-mounting, lavatory-type fixture. Include steel uprights with feet.

2. Accessible-Fixture Support: Include rectangular steel uprights.

2.07 WATER CLOSETS

A. Water Closet, WC-1: Wall hung, back outlet, vitreous-china fixture designed for flushometer valve operation.

1. Available Products:

a. American Standard, Inc., model 3351.101

b. Kohler.

c. Zurn Industries.

d. Approved Equal

2. Style: Flushometer valve.

3. Bowl Type: Elongated with siphon-jet design. Include bolt caps matching fixture.

4. Trapway: Sized to pass a 2” ball.

5. Water Surface: 10” x 12” minimum.
6. Height: 15” to rim from floor.
7. Design Consumption: 1.6/1.1 gal./flush.
8. Color: White.
9. Flushometer: FV-1.
10. Toilet Seat: TS-1.

B. Water Closet, WC-1A: Accessible, wall hung, back outlet, vitreous-china fixture designed for flushometer valve operation.

1. Same as WC-1 but mounted at ADA-compliant height, 16.5” to rim from floor.

2.08 URINALS

A. Urinals, U-1: Wall-hanging, back-outlet, vitreous-china fixture designed for flushometer valve operation.

1. Available Products:
   a. American Standard, Inc., model 6590.001.
   b. Kohler.
   c. Zurn Industries.
   d. Approved Equal
2. Type: Washout with extended shields.
3. Strainer or Trapway: Open trapway with integral trap.
4. Design Consumption: 0.125 gal./flush (3.8 L/flush).
5. Color: White.
6. Supply Spud Size: NPS 3/4 (DN 20).
7. Outlet Size: NPS 2 (DN 50).
8. Flushometer: FV-2.
9. Fixture Support: Urinal US-1 chair carrier.

2.09 LAVATORIES

A. Barrier Free Lavatory, LAV-1: Oval, vitreous china, counter mounted.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. American Standard America; model 0475.028
   b. Kohler Co.
   c. Zurn Industries, LLC; Commercial Brass and Fixtures.
2. Fixture:

a. Standard: ASME A112.19.2/CSA B45.1.
b. Type: For undercounter mounting.
c. Nominal Size: Oval, 20 3/8” by 17 3/8” inches
d. Faucet-Hole Punching: 4” centers to match faucet.
e. Faucet-Hole Location: On bowl.
f. Color: White.
g. Mounting Material: Sealant.

3. Faucet: LF-1.
4. Support: Counter, drop-in.

2.10 KITCHEN SINKS

A. Stainless Steel Sinks, S-1:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Dayton Products, Inc.
   b. Elkay Manufacturing Co.; model LRAD221955.
   c. Just Manufacturing Company.
   d. Kohler
2. Description: Single, stainless-steel, self rimming kitchen sink.
   a. Overall Dimensions: 22” x 19 1/2”.
   b. Metal Thickness: 18 gauge.
   c. Bowl:
      1) Dimensions: 18” x 14” x 5 3/8”
      2) Drain: 3-1/2” crumb cup.
      3) Location: Centered in rear of bowl.
   d. Sink Faucet: SF-1.
   e. Supplies: NPS 1/2 chrome-plated copper with stops.
   f. Drain Piping: NPS 1-1/2 chrome-plated, cast-brass P-trap; 0.045” thick tubular brass waste to wall; continuous waste; and wall escutcheon(s).

B. Stainless Steel Sinks, S-2:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Dayton Products, Inc.
   b. Elkay Manufacturing Co.; model LRAD291855.
   c. Just Manufacturing Company.

d. Kohler

2. Description: Accessible, double bowl, stainless-steel, self rimming kitchen sink.
   a. Overall Dimensions: 29” x 18”.
   b. Metal Thickness: 18 gauge.
   c. Two Bowls:
      1) Dimensions: 12” x 122” x 5 ½” each
      2) Drain: 3-1/2” crumb cup.
      3) Location: Centered in bowl.
   d. Sink Faucet: SF-1.
   e. Supplies: NPS 1/2 chrome-plated copper with stops.
   f. Drain Piping: NPS 1-1/2 chrome-plated, cast-brass P-trap; 0.045” thick tubular brass waste to wall; continuous waste; and wall escutcheon(s).

2.11 SERVICE BASINS

A. Service Basin, JS-1: Flush-to-wall, floor-mounting precast terrazzo basin with rim guard.
   1. Available Products:
      a. Acorn Engineering Co.
      b. Crane Plumbing/Fiat Products, model MSB-2424-QIC32
      c. Florestone Products Co.
      d. Stern-Williams Co., Inc.
   2. Shape: Square.
   3. Size: 24” x 24” (610 x 610 mm).
   4. Height: 10” (255 mm).
   5. Rim Guard: On all top surfaces.
   6. Color: Not applicable.
   7. Faucet: Sink SF-1.
   8. Drain: Grid with NPS 2 (DN 50) outlet.
   9. Accessories: Hose and hose bracket, mop hanger.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before plumbing fixture installation.

B. Examine cabinets, counters, floors, and walls for suitable conditions where fixtures will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Assemble plumbing fixtures, trim, fittings, and other components according to manufacturers' written instructions.

B. Install off-floor supports, affixed to building substrate, for wall-mounting fixtures.

1. Use carrier supports with waste fitting and seal for back-outlet fixtures.

2. Use carrier supports without waste fitting for fixtures with tubular waste piping.

3. Use chair-type carrier supports with rectangular steel uprights for accessible fixtures.

C. Install floor-mounting fixtures on closet flanges or other attachments to piping or building substrate.

D. Install wall-mounting fixtures with tubular waste piping attached to supports.

E. Install floor-mounting, back-outlet water closets attached to building floor substrate and wall bracket and onto waste fitting seals.

F. Install counter-mounting fixtures in and attached to casework.

G. Install fixtures level and plumb according to roughing-in drawings.

H. Install water-supply piping with stop on each supply to each fixture to be connected to water distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.

1. Exception: Use ball, gate, or globe valves if supply stops are not specified with fixture. Valves are specified in Division 22 Section "General-Duty Valves for Plumbing Piping."

I. Install trap and tubular waste piping on drain outlet of each fixture to be directly connected to sanitary drainage system.

J. Install tubular waste piping on drain outlet of each fixture to be indirectly connected to drainage system.

K. Install flushometer valves for accessible water closets and urinals with handle mounted on wide side of compartment. Install other actuators in locations that are easy for people with disabilities to reach.

L. Install toilet seats on water closets.

M. Install faucet-spout fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.

N. Install water-supply flow-control fittings with specified flow rates in fixture supplies at stop valves.

O. Install faucet flow-control fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.

P. Install cartridge filters below sinks using manufacturer's standard mounting brackets. Installation shall permit servicing of filters. Connect to faucet-spout fittings. Connect to cold water supply below sink with shut off valve.

Q. Install waste disposers on sink outlets where indicated. Connect to sink waste and dishwasher drain piping.

R. Install traps on fixture outlets.

1. Exception: Omit trap on fixtures with integral traps.

2. Exception: Omit trap on indirect wastes, unless otherwise indicated.

S. Install escutcheons at piping wall ceiling penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding fittings. Escutcheons are specified in 22 Section "Escutcheons for Plumbing Piping"

T. Set service basins in leveling bed of cement grout.

U. Seal joints between fixtures and walls, floors, and countertops using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Sealants are specified in Division 7 Section "Joint Sealants."

3.03 CONNECTIONS

A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

C. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

D. Connect wiring according to Division 26 Section "Medium Voltage Cable."

3.04 FIELD QUALITY CONTROL

A. Verify that installed plumbing fixtures are categories and types specified for locations where installed.

B. Check that plumbing fixtures are complete with trim, faucets, fittings, and other specified components.

C. Inspect installed plumbing fixtures for damage. Replace damaged fixtures and components.

D. Test installed fixtures after water systems are pressurized for proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.

E. Install fresh batteries in sensor-operated mechanisms.

3.05 ADJUSTING

A. Operate and adjust faucets and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.

B. Adjust water pressure at faucets and flushometer valves to produce proper flow and stream.

C. Replace washers and seals of leaking and dripping faucets and stops.

D. Install fresh batteries in sensor-operated mechanisms.

3.06 CLEANING

A. Clean fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials. Do the following:

1. Remove faucet spouts and strainers, remove sediment and debris, and reinstall strainers and spouts.

2. Remove sediment and debris from drains.

B. After completing installation of exposed, factory-finished fixtures, faucets, and fittings, inspect exposed finishes and repair damaged finishes.

3.07 PROTECTION

A. Provide protective covering for installed fixtures and fittings.

B. Do not allow use of plumbing fixtures for temporary facilities.

END OF SECTION

SECTION 22 4700

DRINKING FOUNTAINS AND WATER COOLERS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General Conditions and other Division 1 Specification Sections, apply to the Work of this Section.

1.02 SUMMARY

A. Section includes pressure water coolers and related components.

1.03 ACTION SUBMITTALS

A. Product Data: For each type of pressure water cooler.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

1.04 CLOSEOUT SUBMITTALS

A. Maintenance Data: For pressure water coolers to include in maintenance manuals.

1.05 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Filter Cartridges: Equal 100 percent of quantity installed for each type and size indicated, but no fewer than one of each.

PART 2 - PRODUCTS

2.01 PRESSURE WATER COOLERS

A. Water Coolers, EWC-1:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Elkay Manufacturing Co. EZSTL8WSSK.

b. Halsey Taylor.

c. Haws Corporation.

d. Oasis Corporation.

e. Sunroc Corp.

2. Description: ARI 1010, Bi-level, accessible, pressure with bubbler, recessed water cooler.

a. Cabinet: All stainless steel, bi-level with two round basins.

b. Bubbler: Two, with adjustable stream regulator, located on deck.

c. Control: Push button.

d. Bottle Filler: Required

e. Supply: NPS 3/8 with ball, gate, or globe valve.

f. Filter: One or more water filters complying with NSF 42 and NSF 53 for cyst and lead reduction to below EPA standards; with capacity sized for unit peak flow rate.

g. Drain: Grid with NPS 1-1/4 minimum horizontal waste and trap complying with ASME A112.18.2.

h. Cooling System: Electric, with hermetically sealed compressor, cooling coil, air-cooled condensing unit, corrosion-resistant tubing, refrigerant, corrosion-resistant-metal storage tank, and adjustable thermostat.

i. Capacity: 8 gph of 50 deg F cooled water from 80 deg F inlet water and 90 deg F ambient air temperature.

j. Electrical Characteristics: 325 watts; 120-V ac; single phase; 60 Hz.

k. Ventilation Grille: Stainless steel, located below fountain.

l. Support: Mounting frame for attaching to substrate.

2.02 FIXTURE SUPPORTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Josam Co.

2. MIFAB Manufacturing, Inc.

3. Smith, Jay R. Mfg. Co.

4. Tyler Pipe; Wade Div.

5. Watts Drainage Products Inc.; a div. of Watts Industries, Inc.

6. Zurn Plumbing Products Group; Specification Drainage Operation.

B. Description: ASME A112.6.1M, water cooler carriers. Include vertical, steel uprights with feet and tie rods and bearing plates with mounting studs matching fixture to be supported.

1. Type II: Bilevel, hanger-type carrier with three vertical uprights.

2. Supports for Accessible Fixtures: Include rectangular, vertical, steel uprights instead of steel pipe uprights.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine roughing-in for water-supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before fixture installation.

B. Examine walls and floors for suitable conditions where fixtures will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install fixtures level and plumb according to roughing-in drawings. For fixtures indicated for children, install at height required by authorities having jurisdiction.

B. Install water-supply piping with shutoff valve on supply to each fixture to be connected to domestic-water distribution piping. Use ball, gate, or globe valve. Install valves in locations where they can be easily reached for operation. Valves are specified in Section 220523 "General-Duty Valves for Plumbing Piping."

C. Install trap and waste piping on drain outlet of each fixture to be connected to sanitary drainage system.

D. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons where required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 22 05 18 "Escutcheons for Plumbing Piping."

E. Seal joints between fixtures and walls using sanitary-type, one-part, mildew-resistant, silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 07 92 00 "Joint Sealants."

3.03 CONNECTIONS

A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

B. Comply with water piping requirements specified in Section 22 11 16 "Domestic Water Piping."

C. Install ball, gate, or globe shutoff valve on water supply to each fixture. Install valve upstream from filter for water cooler. Comply with valve requirements specified in Section 22 05 23 "General-Duty Valves for Plumbing Piping."

D. Comply with soil and waste piping requirements specified in Section 22 13 16 "Sanitary Waste and Vent Piping."

3.04 ADJUSTING

A. Adjust fixture flow regulators for proper flow and stream height.

B. Adjust pressure water-cooler temperature settings.

3.05 CLEANING

A. After installing fixture, inspect unit. Remove paint splatters and other spots, dirt, and debris. Repair damaged finish to match original finish.

B. Clean fixtures, on completion of installation, according to manufacturer's written instructions.

C. Provide protective covering for installed fixtures.

D. Do not allow use of fixtures for temporary facilities.

END OF SECTION

SECTION 23 0500

COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:

1. Piping materials and installation instructions common to most piping systems.
2. Equipment installation requirements common to equipment sections.

B. When used in these specifications the term “Provide” is defined to mean “furnish and install” materials, equipment, etc.

C. When noted on the drawings that items (materials, equipment, etc.) are owner furnished, this contractor shall install the item and shall provide all trade materials (pipe, fittings, nuts, bolts, etc.) necessary for a complete and operational system.

1.02 SUBMITTALS

A. Prior to the performance of any work or installation of any materials, obtain approval from the Engineer by submitting shop drawings and data sheets.

B. Submittal of shop drawings, product data, and samples will be accepted only when submitted by the Contractor. Data submitted from subcontractors and material suppliers directly to the engineer of record will not be processed.

C. Any items with a tag number must be submitted for review. Submittals shall provide all pertinent data and information necessary to evaluate each item. In addition to the requirements outlined in the Division 1 sections and specific Division 23 sections, all submittals must indicate the applicable specification section number and equipment tag number.

D. Engineer’s review of shop drawings does not release Contractor from responsibility of coordinating his work at jobsite and taking field measurements. In cases where interferences become apparent, the Contractor shall notify Engineer so that such interferences may be resolved prior to proceeding with shop work. No claim will be allowed for work that might have to be moved or replaced based on a claim that work was placed in accordance with dimensions shown on an approved shop drawing.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.04 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for HVAC installations.

B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

C. Coordinate requirements for access panels and doors for HVAC items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Frames."

D. Coordinate with the building trades:
1. Structural members, pads, and building openings for mechanical equipment, ducts, piping, fans, etc., are the coordination responsibility of the contractor. Any changes in the above requirements will be paid for by the Contractor.
2. The Drawings show the general arrangement, directions and sizes of Equipment, Ductwork, Piping, etc. It is not intended to show every offset and fitting of every site difficulty that may be encountered, but this Contractor shall furnish and install all materials and perform all labor necessary to make complete working systems, ready for use, without extra charge to the Owner or Engineer. All measurements must be verified on the jobsite.
3. Examine the site and all drawings before proceeding with the layout and installation of this work to suit actual conditions. Confer and cooperate with other trades on the job so that all work will be installed in proper relationship. Precise location of parts to coordinate with other work is the responsibility of this Contractor. All systems shall be installed to provide maximum headroom, except where dimensioned otherwise on the drawings.
4. Provide full time superintendent who shall oversee and coordinate the work with other trades and the Engineer.

E. Coordinate with electrical work:
1. All motor starters, relays, contactors, etc. supplied as part of packaged equipment shall meet the requirements of the Division 26 Specifications.
2. All other motor starters, relays, contactors, etc. shall be provided under Division 26 specifications or as shown on the electrical drawings.

3. All control wiring for control devices, magnetic coils, damper operators, etc. shall not exceed 120 volts. Where power voltage for equipment is over 120 volts, a transformer shall be provided and wired for the controls.
4. Control wiring to solenoid and control valves, variable air volume terminals, damper operators, and all other control or controlled devices is to be provided under Division 23, in accordance with the requirements of Division 26, unless otherwise shown on the Electrical Drawings.
5. 120-volt power source for equipment will be made available, under Division 26, at the distribution breaker panels as indicated on the electrical drawings.

1.05 SITE EXAMINATION AND PRE-BID INSPECTION

A. This project consists of the finish out of an existing shell building into a data center and includes the installation of chillers, computer room units, air handling units, roof top units and related piping and ductwork modifications. Prior to submitting a bid for the proposed work, contractors shall examine the documents and construction site carefully, noting locations and conditions under which the work will be performed and accepting the responsibility for performing the work under the existing conditions.

B. Submittal of a bid indicates the contractor understands the scope and complexity of the work and accepts the responsibilities for performing the work under the existing conditions in accordance with all applicable codes and regulations, within the allotted schedule.

1.06 CONSTRUCTION PERMITS AND INSPECTIONS

A. Contractor shall file for and obtain all required permits and licenses, and pay all related inspection and permitting fees, as required for the execution of the contract. Arrange for necessary inspections required by City, County, State and other Authorities Having Jurisdiction in a timely manner and as required over the complete course of construction. Deliver inspection certificates and written approval notices to the Owner at contract closeout. Those items and systems deemed critical or required to obtain a completed Certificate of Occupancy shall take priority over non-critical items.

B. Any deficiencies noted by the various inspection departments, by the Engineer, or by Authorities Having Jurisdiction shall be addressed immediately and corrected in a timely fashion in order to avoid a delay in the construction sequence or in obtaining a Certificate of Occupancy.

1.07 WORKMANSHIP AND QUALIFICATIONS

A. All equipment, materials, specialties, etc., shall be installed and connected in accordance with the best engineering practice and standards for this type work. Unless otherwise specified or

shown on the Drawings, the recommendations and instructions of the manufacturer shall be followed for installing the work.

B. Contractor shall be experienced and fully licensed to perform construction of the type and class required under this contract.

C. Contractor shall keep a competent superintendent and any necessary assistants satisfactory to the Owner and the Engineer in charge during the progress of the work. Contractor's superintendent shall properly coordinate and time the mechanical work with the work of other trades and in particular with roofing and electrical work to avoid errors and delays. Contractor shall pay cost involved due to his failure to comply with these requirements or due to his failure to acquaint himself with the work in progress of the other trades.

D. All workmen shall be skilled in the task assigned them.

E. Work shall be completed in a neat, orderly and professional manner.

F. Should any dispute arise as to the quality or fitness of any material or workmanship, the decision shall rest with the Engineer.

G. Steel Support Welding: Qualify process and operators according to AWS D1.1. "Structural Welding Code – Steel."

H. Steel Pipe Welding: Qualify process and operators according to ASME Boiler and Pressure Vessel Code: Section IX "Welding and Brazing Qualifications." Comply with provisions in ASME B31 Series. "Code for Pressure Piping." Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current. All welders employed for this work shall be qualified by the contractor under the qualification procedures specified by the American Welding Societies' standard D10.9 Level AR-3. Evidence of welder's qualifications shall be submitted to the Engineer before any welds are made.

1.08 SUBMITTALS

A. Prior to the performance of any work or installation of any materials, obtain approval from the Engineer by submitting shop drawings and data sheets.

B. Submittal of shop drawings, product data, and samples will be accepted only when submitted by the Contractor. Data submitted from subcontractors and material suppliers directly to the engineer of record will not be processed.

C. Any items with a tag number must be submitted for review. Submittals shall provide all pertinent data and information necessary to evaluate each item. In addition to the requirements outlined in the Division 1 sections and specific Division 23 sections, all submittals must indicate the applicable specification section number and equipment tag number.

D. Engineer's review of shop drawings does not release Contractor from responsibility of coordinating his work at jobsite and taking field measurements. In cases where interferences become apparent, the Contractor shall notify Engineer so that such interferences may be resolved prior to proceeding with shop work. No claim will be allowed for work that might have to be moved or replaced based on a claim that work was placed in accordance with dimensions shown on an approved shop drawing.

1.09 CONSTRUCTION DOCUMENTS

A. The drawings for mechanical work are in part diagrammatic, intended to convey the scope of work and indicate general arrangement and approximate sizes and locations of equipment and materials. Where job conditions require reasonable changes in indicated locations and arrangement, the contractor shall make such changes as directed by the engineer, without additional cost to the Owner.

B. Because of the scale of the drawings, certain basic items such as pipe fittings, access panels, sleeves, etc. may not be shown; but where such items are required by the nature of the work, they shall be furnished and installed. Rough-in dimensions and locations shall be verified with the supplier of all equipment furnished by other trades, or by the owner, prior to the time of rough-in.

C. Equipment specifications may not deal individually with minute items required such as components, part, controls and devices which may be required to meet the equipment warranties. Where such items are required, they shall be included by the supplier of the equipment, whether or not specifically called for.

D. The drawings and the specifications are cooperative and supplementary. It is the intent of both said drawings and specifications to cover all mechanical requirements in their entirety as nearly as possible. The contractor shall closely check the drawings and specifications for any obvious errors or omissions and bring any such condition to the attention of the Engineer prior to the receipt of bid, in order to permit clarification by means of a mailed Addendum. If there are no questions prior to the bid proposal date, it shall be understood that the drawings and specifications are complete and correct, and that the intent of said documents will be complied with, and the installation to be complete in all respects, according to said intent. If there is a conflict between the drawings and specifications, the more stringent requirement shall govern, if not clarified in writing by the Engineer.

E. The Contractor shall locate all equipment which must be serviced, operated or maintained in full accessible positions. Minor deviations from the contract drawings may be made to allow for better accessibility, but changes of magnitude, or which involve extra cost, shall not be made without approval. Ample space shall be allowed for removal of all parts that may require replacement or service in the future.

1.10 RECORD DOCUMENTS

A. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings as required in Division 1 of these specifications. As the work progresses mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
   1. Mark new information that is important to the Owner, but was not shown on Contract Drawings or Shop Drawings. Include all change order items, bulletins, addenda, or field changes.
   2. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set. Submit the record drawings as part of the project closeout package.
   3. Ductwork mains and branches, size and location, for both exterior and interior; locations of dampers and other control devices; filters, boxes, and terminal units requiring periodic maintenance or repair.
   4. Mains and branches of piping systems, with valves and control devices located and numbered, concealed unions located, and with items requiring maintenance located (i.e., traps, strainers, expansion compensators, tanks, etc.). Valve location diagrams, complete with valve tag chart. Refer to Division 23 Section "Mechanical Identification." Indicate actual inverts and horizontal locations of underground piping.
   5. Equipment locations (exposed and concealed), dimensioned from prominent building lines.
   6. Approved substitutions, contract modifications, and actual equipment and materials installed.
   7. Include all “Corrected For Record” shop drawings to reflect approvals received.

B. Engage the services of a Land Surveyor or Professional Engineer to record the locations and invert elevations of all underground installations.

C. Mark Specifications to indicate approved substitutions and actual equipment and materials used.

1.11 MAINTENANCE MANUALS

A. Organize operating and maintenance data into suitable sets of manageable size, meeting the requirements of Division 1. Bind properly indexed data in individual heavy-duty 2-inch, 3-ring vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Include the following types of information:
   1. Spare parts list.
   2. Copies of warranties.
   3. Wiring diagrams.

4. Inspection procedures.
5. Approved Shop Drawings and Product Data.
6. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts.
7. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions.
8. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
9. Servicing instructions and lubrication charts and schedules.
10. Provide an index for equipment which shall include the Manufacturer and local representative with address and telephone number.

1.12 WARRANTIES

A. Refer to Division 1 for procedures and submittal requirements for warranties. Refer to individual equipment specifications for warranty requirements.

B. Compile and assemble the warranties of equipment specified in Division 23, into a separated set of vinyl covered, three ring binders, tabulated and indexed for easy reference.

C. Provide complete warranty information for each item of product or equipment to include date of beginning of warranty or bond; duration of warranty or bond; and names, addresses, and telephone numbers and procedures for filing a claim and obtaining warranty services.

D. This contractor shall provide warranty coverage on all materials and equipment installed, including owner furnished equipment, for a period of one (1) year from the date of substantial completion. The warranty shall cover the cost of labor and material for the repair or replacement of any and all defective materials.

1.13 PRODUCT LISTING

A. Prepare listing of major mechanical equipment and materials for the project.

B. When two or more items of same material or equipment are required, they shall be by the same manufacturer. Product manufacturer uniformity does not apply as applicable for project to raw materials, bulk materials, pipe, tube, fittings (except flanged and grooved types), sheet metal, wire, steel bar stock, welding rods, solder, fasteners, motors for dissimilar equipment units, and similar items used in work, except as otherwise indicated.

C. Provide products which are compatible with systems and other connected items.

PART 2 - PRODUCTS

2.01 DESIGN BASIS

A. The products/materials specifically named in the specification and/or on the Drawings are the basis of design. The Engineer and/or Owner's Representative reserves the right to reject product/materials, even if from other acceptable manufacturers, if it is felt they do not meet the intent of the specification.

B. The Engineer reserves the sole right for the approval of proposed material for equipment, and the phrase, "or an approved equivalent", used in these specifications, or on the drawings, shall be interpreted to mean an equivalent approved by the Engineer.

C. All changes required by alternate equipment shall be made at no additional cost to the owner; and all costs incurred by other trades, public utilities or the owner, as a result of the use of such equipment, shall be the responsibility of the contractor.

D. The Contractor shall identify the differences in alternate material or equipment as compared to that specified, and shall indicate the benefits to the project as a result of selecting the alternative.

E. The Engineer reserves the right to refuse approval of equipment which does not meet the specification, in his opinion, or of equipment for which no local experience of satisfactory service is available. The Engineer further reserves the right to reject equipment for which maintenance service and the availability of replacement parts is questionable.

PART 3 - EXECUTION

3.01 PIPING SYSTEMS - COMMON REQUIREMENTS

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

B. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping free of sags and bends.

F. Install fittings for changes in direction and branch connections.

G. Install piping to allow application of insulation.

H. Select system components with pressure rating equal to or greater than system operating pressure.

3.02 PIPING JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

3.03 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

C. Install HVAC equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

3.04 CONCRETE BASES

A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.

1. Construct concrete bases of dimensions indicated, but not less than 4 inches (100 mm) larger in both directions than supported unit.

2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of the base.
3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
5. Install anchor bolts to elevations required for proper attachment to supported equipment.
6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
7. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete and reinforcement as specified in Division 03 Section" Cast-in-Place Concrete.

3.05 GROUTING

A. Mix and install grout for HVAC equipment base

B. Clean surfaces that will come into contact with grout.

C. Provide forms as required for placement of grout.

D. Avoid air entrapment during placement of grout.

E. Place grout, completely filling equipment bases.

F. Place grout on concrete bases and provide smooth bearing surface for equipment.

G. Place grout around anchors.

H. Cure placed grout.

END OF SECTION

SECTION 23 0513

COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes single- and three-phase motors for application on equipment provided under other sections.

1.02 REFERENCES

A. American Bearing Manufacturers Association:

1. ABMA 9 - Load Ratings and Fatigue Life for Ball Bearings.

B. National Electrical Manufacturers Association:

1. NEMA MG 1 - Motors and Generators.

C. International Electrical Testing Association:

1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

1.03 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit catalog data for each motor furnished loose. Indicate nameplate data, standard compliance, electrical ratings and characteristics, and physical dimensions, weights, mechanical performance data, and support points.

C. Test Reports: Indicate procedures and results for specified factory and field testing and inspection.

1.04 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Testing Agency: Company member of International Electrical Testing Association and specializing in testing products specified in this section with minimum three years documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Product storage and handling requirements.

B. Lift only with lugs provided. Handle carefully to avoid damage to components, enclosure, and finish.

C. Protect products from weather and moisture by covering with plastic or canvas and by maintaining heating within enclosure.

D. For extended outdoor storage, remove motors from equipment and store separately.

PART 2 - PRODUCTS

2.01 PRODUCT REQUIREMENTS FOR MOTORS FURNISHED WITH EQUIPMENT

A. Motors 3/4 hp and Larger: Three-phase motor as specified below.

B. Motors Smaller Than 3/4 hp: Single-phase motor as specified below, except motors less than 250 watts or 1/4 hp may be equipment manufacturer's standard.

C. Three-Phase Motors: NEMA MG 1, Design B, energy-efficient squirrel-cage induction motor, with windings to accomplish starting methods and number of speeds.

1. Voltage: As indicated on Drawings.
2. Enclosure: Meet conditions of installation.
3. Design for continuous operation in 40 degrees C environment, with temperature rise in accordance with NEMA MG 1 limits for insulation class, service factor, and motor enclosure type.
4. Insulation System: NEMA Class F.
5. Motor Frames: NEMA Standard T-Frames of steel, aluminum, or cast iron with end brackets of cast iron or aluminum with steel inserts.
6. Thermistor System (Motor Frame Sizes 254T and Larger): Three PTC thermistors embedded in motor windings and epoxy encapsulated solid state control relay with wiring to terminal box.
7. Bearings: Grease lubricated anti-friction ball bearings with housings equipped with plugged provision for relubrication, rated for minimum ABMA 9, L-10 life of 200,000 hours. Calculate bearing load with NEMA minimum V-belt pulley with belt center line at end of NEMA standard shaft extension. Stamp bearing sizes on nameplate.

8. Sound Power Levels: Conform to NEMA MG 1.

D. Single Phase Motors:

1. Permanent split-capacitor type where available, otherwise use split-phase start/capacitor run or capacitor start/capacitor run motor.

E. Wiring Terminations: Furnish terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated.

PART 3 - EXECUTION

3.01 EXISTING WORK

A. Disconnect and remove abandoned motors

B. Maintain access to existing motors and other installations remaining active and requiring access. Modify installation or provide access panel.

C. Clean and repair existing motors to remain or are to be reinstalled.

3.02 INSTALLATION

A. Install securely on firm foundation. Mount ball bearing motors in accordance with motor manufacturer's requirements.

B. Install engraved plastic nameplates in accordance with Section 260553.

C. Ground and bond motors in accordance with Section 260526.

3.03 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Perform inspections and tests listed in NETA ATS, Section 7.15.

END OF SECTION

SECTION 23 0548

VIBRATION AND SEISMIC CONTROLS FOR HVAC

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Vibration isolators.

1.02 PREINSTALLATION MEETINGS

A. Section 013000 - Administrative Requirements: Requirements for preinstallation meeting.

B. Convene minimum one week prior to commencing Work of this Section.

1.03 SUBMITTALS

A. Product Data:

1. Submit schedule of vibration isolator type with location and load on each.
2. Submit manufacturer catalog information indicating materials, dimensional data, pressure losses, and acoustical performance for standard sound attenuation products.

B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

C. Delegated Design Submittals: Submit signed and sealed Shop Drawings with design calculations and assumptions indicating that maximum room sound levels are not exceeded.

D. Manufacturer Instructions:

1. Submit special procedures and setting dimensions.
2. Indicate installation requirements maintaining integrity of sound isolation.

E. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

F. Manufacturer Reports: Certify that sound isolation installation is complete and complies with instructions.

G. Qualifications Statements:

1. Submit qualifications for manufacturer, installer, and licensed professional.
2. Submit manufacturer's approval of installer.

1.04 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.

1.05 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.

B. Installer: Company specializing in performing Work of this Section with minimum three years' documented experience and approved by manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

C. Store materials according to manufacturer instructions.

D. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
2. Provide additional protection according to manufacturer instructions.

1.07 EXISTING CONDITIONS

1.08 WARRANTY

A. Section 017000 - Execution and Closeout Requirements: Requirements for warranties.

B. Furnish five-year manufacturer's warranty for inertia bases.

PART 2 - PRODUCTS

2.01 PERFORMANCE AND DESIGN CRITERIA

A. Provide vibration isolation devices on motor-driven equipment over 0.5 hp, plus connected piping and ductwork.

2.02 VIBRATION ISOLATORS

A. Manufacturers:

1. Ace Mountings Co., Inc.
2. Amber/Booth Company, Inc.; a VMC Group Company.
3. California Dynamics Corporation.
4. Isolation Technology, Inc.
5. Kinetics Noise Control, Inc.
6. Mason Industries, Inc.
7. Vibration Eliminator Co., Inc.
8. Vibration Isolation.
9. Vibration Mountings & Controls, Inc.

B. Open Spring Isolators:

1. Spring Isolators:

    a. Exterior and Humid Areas: Furnish hot-dip galvanized housings and neoprene-coated springs.
    b. Code: Color-code springs based on load carrying capacity.

2. Springs:

    a. Minimum Horizontal Stiffness: 75 percent of vertical stiffness.
    b. Working Deflection: Between 30 and 60 percent of maximum deflection.

3. Spring Mounts: Furnish leveling devices, minimum 0.25-inch-thick neoprene sound pads, and zinc chromate-plated hardware.
4. Sound Pads:

    a. Size: Based on minimum deflection of 0.05 inch.
    b. As specified for neoprene pad isolators.

C. Restrained Spring Isolators:

1. Spring Isolators:

a. Exterior and Humid Areas: Furnish hot-dip galvanized housings and neoprene-coated springs.
b. Code: Color-code springs based on load carrying capacity.

2. Springs:

a. Minimum Horizontal Stiffness: 75 percent of vertical stiffness.
b. Working Deflection: Between 30 and 60 percent of maximum deflection.

3. Spring Mounts: Furnish leveling devices, minimum 0.25-inch-thick neoprene sound pads, and zinc chromate-plated hardware.
4. Sound Pads:

a. Size: Based on minimum deflection of 0.05 inch.

5. As specified for neoprene pad isolators.
6. Restraints: Furnish mounting frame and limit stops.

D. Closed Spring Isolators:

1. Spring Isolators:

a. Exterior and Humid Areas: Furnish hot-dip galvanized housings and neoprene-coated springs.
b. Code: Color-code springs based on load carrying capacity.

2. Type: Closed spring mount with top and bottom housing separated by neoprene rubber stabilizers.
3. Springs:

a. Minimum Horizontal Stiffness: 75 percent of vertical stiffness.
b. Working Deflection: Between 30 and 60 percent of maximum deflection.

E. Restrained Closed Spring Isolators:

1. Spring Isolators:

a. Exterior and Humid Areas: Furnish hot-dip galvanized housings and neoprene-coated springs.
b. Code: Color-code springs based on load carrying capacity.

2. Type: Closed spring mount with top and bottom housing separated by neoprene rubber stabilizers.
3. Springs:

a. Minimum Horizontal Stiffness: 75 percent of vertical stiffness.

b. Working Deflection: Between 30 and 60 percent of maximum deflection.

2.03 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.

B. Verify that equipment, ductwork, and piping are installed before starting Work of this Section.

2.04 PREPARATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.

2.05 INSTALLATION

A. Install isolation for motor-driven equipment.

B. Isolators:

1. Closed Spring Isolators: Adjust such that side stabilizers are clear under normal operating conditions.
2. Prior to making piping connections to equipment with operating weights substantially different from installed weights, block up equipment with temporary shims to final height; when full load is applied, adjust isolators to load to allow shim removal.

END OF SECTION

SECTION 23 0593

TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Testing adjusting and balancing of air systems.
2. Measurement of final operating condition of HVAC systems.
3. Sound measurement of equipment operating conditions.
4. Vibration measurement of equipment operating conditions.

B. Related Sections:
1. Section 230923 - Direct-Digital Control System for HVAC: Requirements for coordination between DDC system and testing, adjusting, and balancing work.
2. Section 230993 - Sequence of Operations for HVAC Controls: Sequences of operation for HVAC equipment.

1.02 REFERENCES

A. Associated Air Balance Council:

1. AABC MN-1 - National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems.

B. American Society of Heating, Refrigerating and Air-Conditioning Engineers:

1. ASHRAE 111 - Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.

C. Natural Environmental Balancing Bureau:

1. NEBB - Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems.

D. Testing Adjusting and Balancing Bureau:

1. TABB - International Standards for Environmental Systems Balance.

1.03 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittal procedures.

B. Prior to commencing Work, submit proof of latest calibration date of each instrument.

C. Field Reports: Indicate deficiencies preventing proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.

D. Prior to commencing Work, submit report forms or outlines indicating adjusting, balancing, and equipment data required. Include detailed procedures, agenda, sample report forms.

E. Submit draft copies of report for review prior to final acceptance of Project.

F. Furnish reports in binder manuals, complete with table of contents page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets and indicating thermostat locations.

1.04 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents: Record actual locations of flow measuring stations balancing valves and rough setting].

C. Operation and Maintenance Data: Furnish final copy of testing, adjusting, and balancing report inclusion in operating and maintenance manuals.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with NFPA 5000, 2021 version.

B. Maintain one copy of each document on site.

C. Prior to commencing Work, calibrate each instrument to be used.

1.06 QUALIFICATIONS

A. Agency: Company specializing in testing, adjusting, and balancing of systems specified in this section with minimum three years documented experience.

B. Perform Work under supervision of Certified Test and Balance Engineer.

1.07 PRE-INSTALLATION MEETINGS

A. Section 013000 - Administrative Requirements: Pre-installation meeting.

B. Convene minimum one week prior to commencing work of this section.

1.08 SEQUENCING

A. Section 011000 - Summary: Work sequence.

B. Sequence balancing between completion of systems tested and Date of Substantial Completion.

1.09 SCHEDULING

A. Section 013000 - Administrative Requirements: Coordination and project conditions.

PART 2 - EXECUTION

2.01 EXAMINATION

A. Section 013000 - Administrative Requirements: Coordination and project conditions.

B. Verify systems are complete and operable before commencing work. Verify the following:

1. Systems are started and operating in safe and normal condition.
2. HVAC control systems are installed complete and operable.
3. Proper thermal overload protection is in place for electrical equipment.
4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
5. Duct systems are clean of debris.
6. Fans are rotating correctly.
7. Air coil fins are cleaned and combed.
8. Access doors are closed and duct end caps are in place.
9. Air outlets are installed and connected.
10. Duct system leakage is minimized.

2.02 PREPARATION

A. Furnish instruments required for testing, adjusting, and balancing operations.

B. Make instruments available to Architect/Engineer to facilitate spot checks during testing.

2.03 INSTALLATION TOLERANCES

A. Air Handling Systems: Adjust to within plus or minus 10 percent of design.

B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

2.04 ADJUSTING

A. Section 017000 - Execution and Closeout Requirements: Testing, adjusting, and balancing.

B. Verify recorded data represents actual measured or observed conditions.

C. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

D. After adjustment, take measurements to verify balance has not been disrupted. If disrupted, verify correcting adjustments have been made.

E. Report defects and deficiencies noted during performance of services, preventing system balance.

F. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

G. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by Owner.

H. Check and adjust systems approximately six months after final acceptance and submit report.

2.05 AIR SYSTEM PROCEDURE

A. Adjust air handling and distribution systems to obtain required or design supply, return, and exhaust air quantities.

B. Make air flow rate measurements in main ducts by Pitot tube traverse of entire cross sectional area of duct.

C. Measure air quantities at air inlets and outlets.

D. Adjust distribution system to obtain:

1. Space temperatures within 2 degrees F.
2. Minimal objectionable drafts.

E. Use volume control devices to regulate air quantities only to extent adjustments do not create objectionable air motion or sound levels. Effect volume control by using volume dampers located in ducts.

F. Vary total system air quantities by adjustment of fan speeds. Provide sheave drive changes to vary fan speed. Vary branch air quantities by damper regulation.

G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.

H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across fan. Make allowances for 50 percent loading of filters.

I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.

K. Check multi-zone units for motorized damper leakage. Adjust air quantities with mixing dampers set first for cooling, then heating, then modulating.

L. For variable air volume system powered units set volume controller to airflow setting indicated. Confirm connections properly made and confirm proper operation for automatic variable-air-volume temperature control.

M. On fan powered VAV boxes, adjust airflow switches for proper operation.

2.06 SCHEDULES

A. Equipment Requiring Testing, Adjusting, and Balancing:
   1. Air Cooled Refrigerant Condensers.
   2. Unit Ventilators.
   3. Air Handling Units.
   4. Fans.
   5. Air Filters.
   6. Air Inlets and Outlets.

B. Report Forms

   1. Title Page:

      a. Name of Testing, Adjusting, and Balancing Agency
      b. Address of Testing, Adjusting, and Balancing Agency
      c. Telephone and facsimile numbers of Testing, Adjusting, and Balancing Agency

d. Project name
e. Project location
f. Project Architect
g. Project Engineer
h. Project Contractor
i. Project altitude
j. Report date

2. Summary Comments:

a. Design versus final performance
b. Notable characteristics of system
c. Description of systems operation sequence
d. Summary of outdoor and exhaust flows to indicate building pressurization.
e. Nomenclature used throughout report.
f. Test conditions

3. Electric Motors:

a. Manufacturer
b. Model/Frame
c. HP/BHP and kW
d. Phase, voltage, amperage; nameplate, actual, no load
e. RPM
f. Service factor
g. Starter size, rating, heater elements
h. Sheave Make/Size/Bore

4. Air Cooled Condenser:

a. Identification/number
b. Location
c. Manufacturer
d. Model number
e. Serial number
f. Entering DB air temperature, design and actual
g. Leaving DB air temperature, design and actual
h. Number of compressors

5. Cooling Coil Data:

a. Identification/number
b. Location
c. Service
d. Manufacturer
e. Air flow, design and actual

f. Entering air DB temperature, design and actual
g. Entering air WB temperature, design and actual
h. Leaving air DB temperature, design and actual
i. Leaving air WB temperature, design and actual
j. Water flow, design and actual
k. Water pressure drop, design and actual.
l. Entering water temperature, design and actual
m. Leaving water temperature, design and actual
n. Saturated suction temperature, design and actual
o. Air pressure drop, design and actual.

6. Unit Ventilator:

a. Manufacturer
b. Identification/number
c. Location
d. Model number
e. Size
f. Air flow, design and actual
g. Water flow, design and actual
h. Water pressure drop, design and actual.
i. Entering water temperature, design and actual
j. Leaving water temperature, design and actual
k. Entering air temperature, design and actual
l. Leaving air temperature, design and actual

7. Air Moving Equipment:

a. Location
b. Manufacturer
c. Model number
d. Serial number
e. Arrangement/Class/Discharge
f. Air flow, specified and actual.
g. Return air flow, specified and actual.
h. Outside air flow, specified and actual.
i. Total static pressure (total external), specified and actual
j. Inlet pressure
k. Discharge pressure
l. Sheave Make/Size/Bore
m. Number of Belts/Make/Size
n. Fan RPM

8. Return Air/Outside Air Data:

a. Identification/location
b. Design air flow
c. Actual air flow
d. Design return air flow
e. Actual return air flow
f. Design outside air flow
g. Actual outside air flow
h. Return air temperature.
i. Outside air temperature
j. Required mixed air temperature.
k. Actual mixed air temperature
l. Design outside/return air ratio
m. Actual outside/return air ratio

9. Exhaust Fan Data:

a. Location
b. Manufacturer
c. Model number
d. Serial number
e. Air flow, specified and actual.
f. Total static pressure (total external), specified and actual
g. Inlet pressure
h. Discharge pressure
i. Sheave Make/Size/Bore
j. Number of Belts/Make/Size
k. Fan RPM

10. Duct Traverse:

a. System zone/branch
b. Duct size
c. Area
d. Design velocity
e. Design air flow
f. Test velocity
g. Test air flow
h. Duct static pressure
i. Air temperature
j. Air correction factor

11. Duct Leak Test:

a. Description of ductwork under test
b. Duct design operating pressure

c. Duct design test static pressure
d. Duct capacity, air flow
e. Maximum allowable leakage duct capacity times leak factor
f. Test apparatus

1) Blower
2) Orifice, tube size
3) Orifice size
4) Calibrated

g. Test static pressure
h. Test orifice differential pressure
i. Leakage

12. Air Distribution Test Sheet:

a. Air terminal number
b. Room number/location
c. Terminal type
d. Terminal size
e. Area factor
f. Design velocity
g. Design air flow
h. Test final velocity
i. Test final air flow
j. Percent of design air flow

13. Sound Level Report:

a. Location
b. Octave bands - equipment off
c. Octave bands - equipment on
d. RC level - equipment on

14. Vibration Test:

a. Location of points:

1) Fan bearing, drive end.
2) Fan bearing, opposite end.
3) Motor bearing, center when applicable.
4) Motor bearing, drive end
5) Motor bearing, opposite end
6) Casing
7) Duct after flexible connection

b. Test readings:

1) Horizontal, velocity and displacement
2) Vertical, velocity and displacement
3) Axial, velocity, and displacement

c. Normally acceptable readings, velocity, and acceleration
d. Unusual conditions at time of test
e. Vibration source

END OF SECTION

SECTION 23 0700

HVAC INSULATION

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. HVAC piping insulation, jackets and accessories.
2. HVAC equipment insulation, jackets and accessories.
3. HVAC ductwork insulation, jackets, and accessories.

B. Related Sections:

1. Section 078400 - Firestopping: Product requirements for firestopping for placement by this section.
2. Section 099000 - Painting and Coating: Execution requirements for painting insulation jackets and covering specified by this section.

1.02 REFERENCES

A. ASTM International:

1. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement.
2. ASTM C449/C449M - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement.
3. ASTM C450 - Standard Practice for Fabrication of Thermal Insulating Fitting Covers for NPS Piping, and Vessel Lagging.
4. ASTM C533 - Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation.
5. ASTM C534 - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.
6. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation.
7. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
8. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
9. ASTM C585 - Standard Practice for Inner and Outer Diameters of Rigid Thermal Insulation for Nominal Sizes of Pipe and Tubing (NPS System).
10. ASTM C591 - Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation.
11. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation.

12. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.
13. ASTM C921 - Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.
14. ASTM C1071 - Standard Specification for Thermal and Acoustical Insulation (Glass Fiber, Duct Lining Material).
15. ASTM C1136 - Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation.
16. ASTM C1290 - Standard Specification for Flexible Fibrous Glass Blanket Insulation Used to Externally Insulate HVAC Ducts.
17. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
18. ASTM D4637 - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane.
19. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials.

B. Sheet Metal and Air Conditioning Contractors:

1. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.

C. Underwriters Laboratories Inc.:

1. UL 1978 - Standard for Safety for Grease Ducts.

1.03 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit product description, thermal characteristics and list of materials and thickness for each service, and location.

C. Samples: Submit two samples of representative size illustrating each insulation type.

D. Manufacturer's Installation Instructions: Submit manufacturers published literature indicating proper installation procedures.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.04 QUALITY ASSURANCE

A. Test pipe insulation for maximum flame spread index of 25 and maximum smoke developed index of not exceeding [450] [50] in accordance with ASTM E84.

B. Pipe insulation manufactured in accordance with ASTM C585 for inner and outer diameters.

C. Factory fabricated fitting covers manufactured in accordance with ASTM C450.

D. Duct insulation, Coverings, and Linings: Maximum 25/50 flame spread/smoke developed index, when tested in accordance with ASTM E84, using specimen procedures and mounting procedures of ASTM E 2231.

E. Perform Work in accordance with NFPA 5000, 2021 version.

F. Maintain one copy of each document on site.

1.05 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Applicator: Company specializing in performing Work of this section with minimum three years documented experience.

1.06 PRE-INSTALLATION MEETINGS

A. Section 013000 - Administrative Requirements: Pre-installation meeting.

B. Convene minimum one week prior to commencing work of this section.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.

C. Protect insulation from weather and construction traffic, dirt, water, chemical, and damage, by storing in original wrapping.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Section 016000 - Product Requirements: Environmental conditions affecting products on site.

B. Install insulation only when ambient temperature and humidity conditions are within range recommended by manufacturer.

C. Maintain temperature before, during, and after installation for minimum period of 24 hours.

1.09 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.10 WARRANTY

A. Section 017000 - Execution and Closeout Requirements: Product warranties and product bonds.

B. Furnish five year manufacturer warranty for manmade fiber.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. Glass Fiber and Mineral Fiber Insulation

1. Manufacturers:

a. CertainTeed LLC; Saint-Gobain North America.
b. Johns Manville; a Berkshire Hathaway company.
c. Knauf Insulation.
d. Manson Insulation Inc.
e. Owens Corning.
f. Substitutions: Section 016000 - Product Requirements.

B. Closed Cell Elastomeric Insulation

1. Manufacturers:

a. Aeroflex USA.
b. Armacell LLC.
c. K-Flex USA.
d. Substitutions: Section 016000 - Product Requirements.

C. Polyisocyanurate Foam Insulation

1. Manufacturers:

a. Duna USA Inc.
b. Dyplast Products.

c. Elliott Company of Indianapolis.
d. ITW Insulation Systems; Illinois Tool Works, Inc.
e. Substitutions: Section 016000 - Product Requirements.

D. Extruded Polystyrene Insulation

1. Manufacturers:

a. Dow Chemical Company.
b. Substitutions: Section 016000 - Product Requirements.

2.02 PIPE INSULATION

A. TYPE P-5: ASTM C534, Type I, flexible, closed cell elastomeric insulation, tubular.

1. Thermal Conductivity: 0.27 at 75 degrees F.
2. Operating Temperature Range: Range: Minus 70 to 180 degrees F.

B. TYPE P-6: ASTM C534, Type I, flexible, closed cell elastomeric insulation, tubular.

1. Thermal Conductivity: 0.30 at 75 degrees F.
2. Maximum Service Temperature: 300 degrees F.
3. Operating Temperature Range: Range: Minus 58 to 300 degrees F.

2.03 PIPE INSULATION JACKETS

A. Vapor Retarder Jacket:

1. ASTM C921, white Kraft paper with glass fiber yarn, bonded to aluminized film.
2. Water Vapor Permeance: ASTM E96/E96M; 0.02 perms.

B. PVC Plastic Pipe Jacket:

1. Product Description: ASTM D1785, One piece molded type fitting covers and sheet material, off-white color.
2. Thickness: 30 mil (0.51 mm).

C. ABS Plastic Pipe Jacket:

1. Jacket: One piece molded type fitting covers and sheet material, off-white color.
2. Minimum service temperature: -40 degrees F.
3. Maximum service temperature of 180 degrees F.
4. Water Vapor Permeance: ASTM E96/E96M; 0.02 perms.
5. Thickness: 30 mil.
6. Connections: Brush on welding adhesive.

D. Aluminum Pipe Jacket:

1. ASTM B209.
2. Thickness: 0.016 inch thick sheet.

E. Stainless Steel Pipe Jacket:

1. Thickness: 0.016 inch thick.

2.04 PIPE INSULATION ACCESSORIES

A. Vapor Retarder Lap Adhesive: Compatible with insulation.

B. Covering Adhesive Mastic: Compatible with insulation.

C. Piping 1-1/2 inches (40 mm) diameter and smaller: Galvanized steel insulation protection shield. MSS SP-69, Type 40. Length: Based on pipe size and insulation thickness.

D. Piping 2 inches (50 mm) diameter and larger: Wood insulation saddle, hard maple. Insert length: not less than 6 inches (150 mm) long, matching thickness and contour of adjoining insulation.

E. Closed Cell Elastomeric Insulation Pipe Hanger: Polyurethane insert with [aluminum] [stainless steel jacket] single piece construction with self-adhesive closure. Thickness to match pipe insulation.

F. Tie Wire: 0.048 inch (1.22 mm) stainless steel with twisted ends on maximum 12 inch centers.

G. Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement: ASTM C449/C449M.

H. Insulating Cement: ASTM C195; hydraulic setting on mineral wool.

I. Adhesives: Compatible with insulation.

2.05 EQUIPMENT INSULATION

A. TYPE E-1: ASTM C553; glass fiber, flexible or semi-rigid, noncombustible.

1. Thermal Conductivity: 0.24 at 75 degrees F.
2. Operating Temperature Range: 0 to 450 degrees F.
3. Density: 1.5 pound per cubic foot.

B. TYPE E-2: ASTM C612; glass fiber, rigid board, noncombustible.

1. Thermal Conductivity: 0.24 at 75 degrees F.

2. Operating Temperature Range: 0 to 450 degrees F.
3. Density: 3.0 pound per cubic foot.
4. Jacket Temperature Limit: minus 20 to 150 degrees F.

C. TYPE E-3: ASTM C612; semi-rigid, fibrous glass board noncombustible, end grain adhered to jacket.

1. Thermal Conductivity: 0.27 at 75 degrees F.
2. Operating Temperature Range: 0 to 650 degrees F.
3. Vapor Barrier Jacket: ASTM C1136, Type II, factory applied reinforced foil kraft with self-sealing adhesive joints.
4. Jacket Temperature Limit: minus 20 to 150 degrees F.

D. TYPE E-4: ASTM C612; semi-rigid, fibrous glass board noncombustible.

1. Thermal Conductivity: 0.27 at 75 degrees F.
2. Operating Temperature Range: 0 to 650 degrees F.

E. TYPE E-5: ASTM C612; glass fiber, semi-rigid board, noncombustible.

1. Thermal Conductivity: 0.23 at 75 degrees F.
2. Maximum Operating Temperature: 850 degrees F.
3. Density: 3.0 pounds per cubic foot.

F. TYPE E-6: ASTM C553; mineral fiber blanket, Type I.

1. Thermal Conductivity: 0.27 at 75 degrees F.
2. Maximum Operating Temperature: 1000 degrees F.
3. Density: 1.0 pound per cubic foot.

G. TYPE E-7: ASTM C533; Type II, hydrous calcium silicate block insulation, asbestos free.

1. Thermal Conductivity: 0.45 at 200 degrees F.
2. Operating Temperature Range: 140 to 1200 degrees F.

H. TYPE E-8: ASTM C534, Type II, flexible, closed cell elastomeric insulation, sheet.

1. Thermal Conductivity: 0.27 at 75 degrees F.
2. Operating Temperature Range: Range: Minus 70 to 220 degrees F.

I. TYPE E-9: ASTM C612, manmade mineral fiber, noncombustible, Classes 1-4.

1. Thermal Conductivity: 0.25 at 100 degrees F.
2. Maximum Service Temperature: 1200 degrees F.
3. Density: 4 pound per cubic foot.

2.06 EQUIPMENT INSULATION JACKETS

A. PVC Plastic Equipment Jacket:

1. Product Description: ASTM D1785, sheet material, off-white color.
2. Minimum Service Temperature: -40 degrees F.
3. Maximum Service Temperature: 150 degrees F.
4. Water Vapor Permeance: ASTM E96/E96M; 0.02 perms.
5. Thickness: 30 mil (0.75 mm).

B. Aluminum Equipment Jacket:

1. ASTM B209

2. Thickness: 0.016 inch thick sheet.

C. Stainless Steel Equipment Jacket:

1. ASTM A240/A240M OR ASTM 666.
2. Thickness: 0.016 inch thick.

D. Canvas Equipment Jacket: UL listed, 6 oz/sq yd, plain weave cotton fabric with fire retardant lagging adhesive compatible with insulation.

E. Vapor Retarder Jacket:

1. ASTM C921, white Kraft paper with glass fiber yarn, bonded to aluminized film.
2. Water Vapor Permeance: ASTM E96/E96M; 0.02 perms.

F. Field Applied Glass Fiber Fabric Jacket System:

1. Insulating Cement/Mastic: ASTM C195; hydraulic setting on mineral wool.
2. Glass Fiber Fabric:

   a. Cloth: Untreated; 9 oz/sq yd weight.
   b. Blanket: 1.0 lb/cu ft density.

3. Indoor Vapor Retarder Finish:

   a. Cloth: Untreated; 9 oz/sq yd weight.
   b. Vinyl emulsion type acrylic, compatible with insulation.

2.07 EQUIPMENT INSULATION ACCESSORIES

A. Vapor Retarder Lap Adhesive: Compatible with insulation.

B. Covering Adhesive Mastic: Compatible with insulation.

C. Tie Wire: 0.048 inch (1.22 mm) stainless steel with twisted ends on maximum 12 inch centers.

D. Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement: ASTM C449/C449M.

E. Adhesives: Compatible with insulation.

2.08 DUCTWORK INSULATION

A. TYPE D-1: ASTM C1290, Type III, flexible glass fiber, commercial grade with factory applied reinforced aluminum foil jacket meeting ASTM C1136, Type II.

1. Thermal Conductivity: 0.25 at 75 degrees F.
2. Maximum Operating Temperature: 250 degrees F.
3. Density: 0.75 pound per cubic foot .

B. TYPE D-2: ASTM C612, Type IA or IB, rigid glass fiber, with factory applied reinforced aluminum foil facing metalized polypropylene scrim kraft facing meeting ASTM C1136, Type II.

1. Thermal Conductivity: 0.22 at 75 degrees F.
2. Density: 1.6 pound per cubic foot.

C. TYPE D-3: ASTM C612, Type IA or IB, rigid glass fiber, no facing.

1. Thermal Conductivity: 0.22 at 75 degrees F.
2. Density: 1.6 pound per cubic foot.

D. TYPE D-6: ASTM C534, Type II, flexible, closed cell elastomeric insulation, sheet.

1. Thermal Conductivity: 0.27 at 75 degrees F.
2. Service Temperature Range: Range: Minus 58 to 180 degrees F.

E. TYPE D-7: ASTM C534, Type II, flexible, closed cell elastomeric insulation, sheet laminated with thermoplastic rubber membrane.

1. Thermal Conductivity: 0.27 at 75 degrees F.
2. Service Temperature Range: Range: Minus 58 to 180 degrees F.

2.09 DUCTWORK INSULATION JACKETS

A. Aluminum Duct Jacket:

1. ASTM B209
2. Thickness: 0.040 inch thick sheet.

B. Vapor Retarder Jacket:

1. Kraft paper with glass fiber yarn and bonded to aluminized film 0.0032 inch vinyl.
2. Water Vapor Permeance: ASTM E96/E96M; 0.02 perms.
3. Secure with pressure sensitive tape.

C. Canvas Duct Jacket: UL listed, 6 oz/sq yd, plain weave cotton fabric with fire retardant lagging adhesive compatible with insulation.

D. Outdoor Duct Jacket: Asphalt impregnated and coated sheet, 36 lb/square.

E. Membrane Duct Jacket: ASTM D4637; Type I, EPDM; non-reinforced, 0.060 inch thick, 48 inch (1220 mm) wide roll.

2.10 DUCTWORK INSULATION ACCESSORIES

A. Vapor Retarder Tape:

1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.

B. Vapor Retarder Lap Adhesive: Compatible with insulation.

C. Adhesive: Waterproof type.

D. Liner Fasteners: Galvanized steel, self-adhesive pad head.

E. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.

F. Lagging Adhesive: Fire retardant type with maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

G. Impale Anchors: Galvanized steel, 12 gage self-adhesive pad.

H. Adhesives: Compatible with insulation.

I. Membrane Adhesives: As recommended by membrane manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Section 013000 - Administrative Requirements: Coordination and project conditions.

B. Verify piping, equipment and ductwork has been tested before applying insulation materials.

C. Verify surfaces are clean and dry, with foreign material removed.

3.02 INSTALLATION - PIPING SYSTEMS

A. Piping Exposed to View in Finished Spaces: Locate insulation and cover seams in least visible locations.

B. Continue insulation through penetrations of building assemblies or portions of assemblies having fire resistance rating of one hour or less. Provide intumescent firestopping when continuing insulation through assembly. Finish at supports, protrusions, and interruptions. Refer to Section 078400 for penetrations of assemblies with fire resistance rating greater than one hour.

C. Piping Systems Conveying Fluids Below Ambient Temperature:

1. Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, [pump bodies,] and expansion joints.
2. Furnish factory-applied or field-applied vapor retarder jackets. Secure factory-applied jackets with pressure sensitive adhesive self-sealing longitudinal laps and butt strips. Secure field-applied jackets with outward clinch expanding staples and seal staple penetrations with vapor retarder mastic.
3. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor retarder adhesive or PVC fitting covers.

D. Glass Fiber Board Insulation:

1. Apply insulation close to equipment by grooving, scoring, and beveling insulation. Fasten insulation to equipment with studs, pins, clips, adhesive, wires, or bands.
2. Fill joints, cracks, seams, and depressions with bedding compound to form smooth surface. On cold equipment, use vapor retarder cement.
3. Cover wire mesh or bands with cement to a thickness to remove surface irregularities.

E. Closed Cell Elastomeric Insulation:

1. Push insulation on to piping.
2. Miter joints at elbows.
3. Seal seams and butt joints with manufacturer's recommended adhesive.
4. When application requires multiple layers, apply with joints staggered.
5. Insulate fittings and valves with insulation of like material and thickness as adjacent pipe.

F. High Temperature Pipe Insulation:

1. Install multiple layers to meet thickness scheduled.
2. Attach each layer with bands. Secure first layer with bands before installing next layer.
3. Stagger joints between layers.
4. Finish with canvas jacket [sized for finish painting].
5. Cover with [aluminum jacket] [stainless steel jacket] with seams located on bottom side of horizontal piping.

G. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet (3 meters) above finished floor): Finish with jacket.

H. Piping Exterior to Building: Provide vapor retarder jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor retarder cement. Cover with [aluminum] [stainless steel] jacket with seams located at 3 or 9 o'clock position on side of horizontal piping with overlap facing down to shed water or on bottom side of horizontal piping.

I. Prepare pipe insulation for finish painting. Refer to Section 099000.

3.03 INSTALLATION - EQUIPMENT

A. Factory Insulated Equipment: Do not insulate.

B. Exposed Equipment: Locate insulation and cover seams in least visible locations.

C. Fill joints, cracks, seams, and depressions with bedding compound to form smooth surface. On cold equipment, use vapor retarder cement.

D. Equipment in Mechanical Equipment Rooms or Finished Spaces: Finish with jacket.

E. Equipment Located Exterior to Building: Install vapor barrier jacket or finish with glass mesh reinforced vapor barrier cement. Cover with stainless steel jacket with seams located on bottom side of horizontal equipment.

F. Cover insulation with jacket.

G. Nameplates and ASME Stamps: Bevel and seal insulation around; do not cover with insulation.

H. Equipment Requiring Access for Maintenance, Repair, or Cleaning: Install insulation for easy removal and replacement without damage.

I. Prepare equipment insulation for finish painting. Refer to Section 099000.

3.04 INSTALLATION - DUCTWORK SYSTEMS

A. Duct dimensions indicated on Drawings are finished inside dimensions.

B. Insulated ductwork conveying air below ambient temperature:

1. Provide insulation with vapor retarder jackets.
2. Finish with tape and vapor retarder jacket.
3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
4. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.

C. Insulated ductwork conveying air above ambient temperature:

1. Provide with or without standard vapor retarder jacket.
2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.

D. Ductwork Exposed in Mechanical Equipment Rooms or Finished Spaces [(below 10 feet (3 meters) above finished floor)]: Finish with [canvas jacket sized for finish painting] [aluminum jacket].

E. External Glass Fiber Duct Insulation:

1. Secure insulation with vapor retarder with wires and seal jacket joints with vapor retarder adhesive or tape to match jacket.
2. Secure insulation without vapor retarder with staples, tape, or wires.
3. Install without sag on underside of ductwork. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift ductwork off trapeze hangers and insert spacers.
4. Seal vapor retarder penetrations by mechanical fasteners with vapor retarder adhesive.
5. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

F. External Elastomeric Duct Insulation:

1. Adhere to clean oil-free surfaces with full coverage of adhesive.
2. Seal seams and butt joints with manufacturer's recommended adhesive.
3. When application requires multiple layers, apply with joints staggered.
4. Insulate standing metal duct seams with insulation of like material and thickness as adjacent duct surface. Apply adhesive at joints with flat duct surfaces.
5. Lift ductwork off trapeze hangers and insert spacers.

G. Ducts Exterior to Building:

1. Install insulation according to [external duct insulation] [duct liner] paragraph above.

2. Provide external insulation with vapor retarder jacket. Cover with outdoor jacket finished.
3. Calk seams at flanges and joints. Located major longitudinal seams on bottom side of horizontal duct sections.

H. Prepare duct insulation for finish painting. Refer to Section 099000.

END OF SECTION

SECTION 23 0800

COMMISSIONING OF HVAC

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. HVAC commissioning description.
2. HVAC commissioning responsibilities.

B. Related Sections:

1. Section 230593 - Testing, Adjusting, and Balancing for HVAC: For requirements and procedures concerning testing, adjusting, and balancing of mechanical systems.
2. Section 230900 - Instrumentation and Control for HVAC: Submittal and training requirements.
3. Section 230923 - Direct-Digital Control System for HVAC: Submittal, training, and programming requirements.
4. Section 230953 - Pneumatic and Electric Control System for HVAC: Submittal and training requirements.
5. Section 233300 - Air Duct Accessories: Product requirements for ductwork test holes.
6. Section 255000 - Integrated Automation Facility Controls: Submittal, training, and programming requirements.

1.02 REFERENCES

A. American Society of Heating, Refrigerating and Air-Conditioning Engineers:

1. ASHRAE Guideline 1 - The HVAC Commissioning Process.

B. Building Commissioning Association:

1. BCA - Commissioning Handbook.

C. National Environmental Balancing Bureau:

1. NEBB - Procedural Standards for Building Systems Commissioning.

D. Testing Adjusting and Balancing Bureau:

1. TABB - Commissioning Manual.

1.03 COMMISSIONING DESCRIPTION

A. HVAC commissioning process includes the following tasks:

1. Testing and startup of HVAC equipment and systems.
2. Equipment and system verification checks.
3. Assistance in functional performance testing to verify testing and balancing, and equipment and system performance.
4. Provide qualified personnel to assist in commissioning tests, including seasonal testing.
5. Complete and endorse functional performance test checklists provided by Commissioning Authority to assure equipment and systems are fully operational and ready for functional performance testing.
6. Provide equipment, materials, and labor necessary to correct deficiencies found during commissioning process to fulfill contract and warranty requirements.
7. Provide operation and maintenance information and record drawings to Commissioning Authority for review verification and organization, prior to distribution.
8. Provide assistance to Commissioning Authority to develop, edit, and document system operation descriptions.
9. Provide training for systems specified in this Section with coordination by Commissioning Authority.

B. Equipment and Systems to Be Commissioned:

1. New HVAC systems that were installed under this Contract.
2. Existing HVAC systems that were modified, adjusted, upgraded, or affected by the work performed under this Contract.

C. The following is a partial list of equipment that may be included in this HVAC Commissioning:
1. Piping systems.
2. Ductwork.
3. Variable frequency drives.
4. Air handling units.
5. Unit heaters.
6. Fans.
7. Equipment sound control.
8. Equipment vibration control.
9. Automatic HVAC control system.
10. Testing, Adjusting and Balancing work.

D. Perform seasonal function performance tests for the following equipment and systems:

1. Heating equipment during heating season.
2. Cooling equipment during cooling season.

1.04 COMMISSIONING SUBMITTALS

A. Section 019100 - Commissioning: Requirements for commissioning submittals.

B. Draft Forms: Submit draft of system verification form and functional performance test checklist.

C. Test Reports: Indicate data on system verification form for each piece of equipment and system as specified. Use AABC forms as guidelines.

D. Field Reports: Indicate deficiencies preventing completion of equipment or system verification checks equipment or system to achieve specified performance.

1.05 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Record revisions to equipment and system documentation necessitated by commissioning.

C. Operation and Maintenance Data: Submit revisions to operation and maintenance manuals when necessary revisions are discovered during commissioning.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with ASHRAE Guideline 1 NEBB TABB requirements.

B. Perform Work in accordance with State.

C. Maintain one copy of each document on site.

1.07 COMMISSIONING RESPONSIBILITIES

A. Equipment or System Installer Commissioning Responsibilities:

1. Attend commissioning meetings.
2. Ensure temperature controls installer performs assigned commissioning responsibilities as specified below.
3. Ensure testing, adjusting, and balancing agency performs assigned commissioning responsibilities as specified.
4. Provide instructions and demonstrations for Owner's personnel.
5. Ensure subcontractors perform assigned commissioning responsibilities.
6. Ensure participation of equipment manufacturers in appropriate startup, testing, and training activities when required by individual equipment specifications.

7. Develop startup and initial checkout plan using manufacturer?s startup procedures and functional performance checklists for equipment and systems to be commissioned.
8. During verification check and startup process, execute HVAC related portions of checklists for equipment and systems to be commissioned.
9. Perform and document completed startup and system operational checkout procedures, providing copy to Commissioning Authority.
10. Provide manufacturer?s representatives to execute starting of equipment. Ensure representatives are available and present during agreed upon schedules and are in attendance for duration to complete tests, adjustments and problem-solving.
11. Coordinate with equipment manufacturers to determine specific requirements to maintain validity of warranties.
12. Provide personnel to assist Commissioning Authority during equipment or system verification checks and functional performance tests.
13. Prior to functional performance tests, review test procedures to ensure feasibility, safety and equipment protection and provide necessary written alarm limits to be used during tests.
14. Prior to startup, inspect, check, and verify correct and complete installation of equipment and system components for verification checks included in commissioning plan. When deficient or incomplete work is discovered, ensure corrective action is taken and re-check until equipment or system is ready for startup.
15. Provide factory supervised startup services for equipment and systems specified in the sections Coordinate work with manufacturer and Commissioning Authority.
16. Perform verification checks and startup on equipment and systems as specified.
17. Assist Commissioning Authority in performing functional performance tests on equipment and systems as specified.
18. Perform operation and maintenance training sessions scheduled by Commissioning Authority.
19. Conduct HVAC system orientation and inspection.

B. Temperature Controls Installer Commissioning Responsibilities:

1. Attend commissioning meetings.
2. Review design for ability of systems to be controlled including the following:

    a. Confirm proper hardware requirements exists to perform functional performance testing.
    b. Confirm proper safeties and interlocks are included in design.
    c. Confirm proper sizing of system control valves and actuators and control valve operation will result capacity control identified in Contract Documents.
    d. Confirm proper sizing of system control dampers and actuators and damper operation will result in proper damper positioning.
    e. Confirm sensors selected are within device ranges.
    f. Review sequences of operation and obtain clarification from Architect/Engineer.
    g. Indicate delineation of control between packaged controls and building automation system, listing BAS monitor points and BAS adjustable control points.

h. Provide written sequences of operation for packaged controlled equipment. Equipment manufacturers? stock sequences may be included, when accompanied by additional narrative to reflect Project conditions.

3. Inspect, check, and confirm proper operation and performance of control hardware and software provided in other HVAC sections.
4. Submit proposed procedures for performing automatic temperature control system point-to-point checks to Commissioning Authority and Architect/Engineer.
5. Inspect check and confirm correct installation and operation of automatic temperature control system input and output device operation through point-to-point checks.
6. Perform training sessions to instruct Owner's personnel in hardware operation, software operation, programming, and application in accordance with commissioning plan and requirements.
7. Demonstrate system performance and operation to Commissioning Authority during functional performance tests including each mode of operation.
8. Provide control system technician to assist during Commissioning Authority verification check and functional performance testing.
9. Provide control system technician to assist testing, adjusting, and balancing agency during performance of testing, adjusting, and balancing work.
10. Assist in performing operation and maintenance training sessions scheduled by Commissioning Authority.

C. Testing, Adjusting, and Balancing Agency Commissioning Responsibilities:

1. Attend commissioning meetings.
2. Participate in verification of testing, adjusting, and balancing report for verification or diagnostic purposes. Repeat sample of 1020 percent of measurements contained in testing, adjusting, and balancing report as indicated in commissioning plan.
3. Assist in performing operation and maintenance training sessions scheduled by Commissioning Authority.

1.08 COMMISSIONING MEETINGS

A. Section 019100 - Commissioning: Requirements for commissioning meetings.

B. Attend initial commissioning meeting and progress commissioning meetings as required by Commissioning Authority.

1.09 SCHEDULING

A. Section 013000 - Administrative Requirements 013216 - Construction Progress Schedule: Requirements for scheduling.

B. Prepare schedule indicating anticipated start dates for the following:

1. Piping system pressure testing.
2. Piping system flushing and cleaning.
3. Ductwork cleaning.
4. Ductwork pressure testing.
5. Equipment and system startups.
6. Automatic temperature control system checkout.
7. Testing, adjusting, and balancing.
8. HVAC system orientation and inspections.
9. Operation and maintenance manual submittals.
10. Training sessions.

C. Schedule seasonal tests of equipment and systems during peak weather conditions to observe full-load performance.

D. Schedule occupancy sensitive tests of equipment and systems during conditions of both minimum and maximum occupancy or use.

1.10 COORDINATION

A. Section 013000 - Administrative Requirements: Requirements for coordination.

B. Notify Commissioning Authority minimum of four weeks in advance of the following:

1. Scheduled equipment and system startups.
2. Scheduled automatic temperature control system checkout.
3. Scheduled start of testing, adjusting, and balancing work.

C. Coordinate programming of automatic temperature control system with construction and commissioning schedules.

PART 2 - PRODUCTS

2.01 Not Used.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install additional balancing dampers, balancing valves, access doors, test ports, and pressure and temperature taps required to meet performance requirements.by commissioning plan.

B. Place HVAC systems and equipment into full operation and continue operation during each working day of commissioning.

C. Install replacement sheaves and belts to obtain system performance, as requested by Commissioning Authority.

D. Install test holes in ductwork and plenums as requested by Commissioning Authority for taking air measurements. Refer to Section 233300.

E. Prior to start of functional performance test, install replacement filters in equipment as specified in individual section in accordance with Section.

3.02 FIELD TESTS AND INSPECTIONS

A. Seasonal Sensitive Functional Performance Tests:

1. Test heating equipment at winter design temperatures.
2. Test cooling equipment at summer design temperatures with fully occupied building.
3. Participate in testing delayed beyond Final Completion Substantial Completion to test performance at peak seasonal conditions.

B. Be responsible to participate in initial and alternate peak season test of systems required to demonstrate performance.

C. Occupancy Sensitive Functional Performance Tests:

1. Test equipment and systems affected by occupancy variations at minimum and peak loads to observe system performance.
2. Participate in testing delayed beyond Final Completion to test performance with actual occupancy conditions.

END OF SECTION

SECTION 23 3100

HVAC DUCTS AND CASINGS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Ducts.
2. Flexible ducts.
3. Single-wall, spiral round ducts.
4. Casings.
5. Ductwork fabrication.
6. Accessories.

B. Related Requirements:

1. Section 033000 - Cast-in-Place Concrete: Requirements for concrete curbs as specified in this Section.
2. Section 099000 - Painting and Coating: Requirements for painting or coating as specified in this Section.
3. Section 233300 - Air Duct Accessories: Requirements for duct accessories as specified in this Section.

1.02 REFERENCE STANDARDS

A. American Society of Heating, Refrigerating and Air-Conditioning Engineers:

1. ASHRAE Handbook - Fundamentals.

B. American Welding Society:

1. AWS D1.1 - Structural Welding Code - Steel.
2. AWS D1.1M - Structural Welding Code - Steel.
3. AWS D1.2 - Structural Welding Code - Aluminum.
4. AWS D1.2M - Structural Welding Code - Aluminum.
5. AWS D9.1 - Sheet Metal Welding Code.
6. AWS D9.1M - Sheet Metal Welding Code.

C. ASTM International:

1. ASTM A36 - Standard Specification for Carbon Structural Steel.
2. ASTM A36M - Standard Specification for Carbon Structural Steel.

3. ASTM A90 - Standard Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.
4. ASTM A90M - Standard Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.
5. ASTM A240 - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
6. ASTM A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
7. ASTM A568 - Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.
8. ASTM A568M - Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.
9. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
10. ASTM A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
11. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
12. ASTM A1008 - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
13. ASTM A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
14. ASTM A1011 - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
15. ASTM A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
16. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
17. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
18. ASTM C14 - Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe.
19. ASTM C14M - Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe (Metric).
20. ASTM C443 - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
21. ASTM C443M - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets (Metric).
22. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

D. International Code Council:

1. International Energy Conservation Code (IECC).
2. International Mechanical Code (IMC).

E. NFPA:

1. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems.
2. NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems.
3. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations.

F. Sheet Metal and Air Conditioning Contractors' National Association:

1. SMACNA 016 - HVAC Air Duct Leakage Test Manual.
2. SMACNA 1767 - Kitchen Ventilation Systems and Food Service Equipment Guidelines.
3. SMACNA 1884 - Fibrous Glass Duct Construction Standards.
4. SMACNA 1966 - HVAC Duct Construction Standards - Metal and Flexible.

G. UL:

1. UL 181 - Factory-Made Air Ducts and Air Connectors.
2. UL 181A - Closure Systems for Use With Rigid Air Ducts.
3. UL 1978 - Grease Ducts.

1.03 PREINSTALLATION MEETINGS

A. Section 013000 - Administrative Requirements: Requirements for preinstallation meeting.

B. Convene minimum one week prior to commencing Work of this Section.

1.04 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit manufacturer information.

C. Shop Drawings:

1. Submit duct fabrication drawings, drawn to scale not smaller than 1/8 inch 1 foot, on sheets same size as Contract Drawings, indicating following:

a. Fabrication, assembly, and installation details, including plans, elevations, sections, details of components, and attachments to other Work.

b. Duct layout that further indicates pressure classifications and sizes in plan view; exhaust duct systems that further indicate classification of materials handled as specified in this Section.
c. Fittings.
d. Reinforcing details and spacing.
e. Seam and joint construction details.
f. Penetrations through fire-rated and other walls.
g. Terminal unit, coil, and humidifier installations.
h. Hangers and supports, including methods for vibration isolation and building and duct attachment.

D. Samples: Submit two typical shop-fabricated duct fittings.

E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

F. Welder Certificates: Certify welders and welding procedures employed on Work, verifying AWS qualification within previous 12 months.

G. Delegated Design Submittals: Submit signed and sealed Shop Drawings with design calculations and assumptions for following:

1. Hangers and supports, including methods for duct and building attachment, seismic restraints, and vibration isolation.
2. Materials, fabrication, assembly, and spacing of hangers and supports.
3. Sheet metal thicknesses.
4. Joint and seam construction and sealing.
5. Reinforcement details and spacing.

H. Test and Evaluation Reports: Indicate pressure tests performed, including date, section tested, test pressure, and leakage rate according to SMACNA 016.

I. Manufacturer Instructions:

1. Submit detailed instructions on installation requirements, including storage and handling procedures.
2. Submit special procedures for glass-fiber ducts.

J. Qualifications Statements:

1. Submit qualifications for manufacturer, installer, and licensed professional.
2. Submit manufacturer's approval of installer.
3. Welders: Qualify procedures and personnel according to AWS D1.1 for hangers and supports, AWS D1.2 for aluminum supports, and AWS D9.1 for duct joint and seam welding.

1.05 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents:

1. Record actual locations of ducts and duct fittings.
2. Record changes in fitting location and type.
3. Show additional fittings used.

1.06 QUALITY ASSURANCE

A. Perform Work according to SMACNA 1884 and 1966.

B. Construct ductwork to NFPA and NFPA 96 standards.

C. Maintain one copyof each standard affecting Work of this Section on Site.

1.07 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.

B. Installer: Company specializing in performing Work of this Section with minimum three years' documented experience [and approved by manufacturer].

C. Welders: AWS qualified within previous 12 months for employed weld types.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

C. Store materials according to manufacturer instructions.

D. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
2. Provide additional protection according to manufacturer instructions.

1.09 AMBIENT CONDITIONS

A. Section 015000 - Temporary Facilities and Controls: Requirements for ambient condition control facilities for product storage and installation.

B. Minimum Conditions: Do not install duct sealant when temperatures are less than those recommended by sealant manufacturer.

C. Subsequent Conditions: Maintain temperatures during and after installation of duct sealant.

1.10 EXISTING CONDITIONS

A. Field Measurements:

1. Verify field measurements prior to fabrication.
2. Indicate field measurements on Shop Drawings.

1.11 WARRANTY

A. Section 017000 - Execution and Closeout Requirements: Requirements for warranties.

B. Furnish five-year manufacturer's warranty for ducts.

PART 2 - PRODUCTS

2.01 DUCTS

A. Performance and Design Criteria:

1. Variation of duct configuration or sizes other than those of equivalent or lower loss coefficient is not permitted except by written permission of Engineer.
2. Size round ducts installed in place of rectangular ducts according to ASHRAE Handbook - Fundamentals.

B. Materials:

C. Galvanized-Steel Ducts:

1. Material: ASTM A653 galvanized-steel sheet.
2. Quality: Lock forming.
3. Finish: Zinc coating according to ASTM A90 .

D. Fasteners: Rivets, bolts, or sheet metal screws.

E. Hanger Rod:

1. Material: Galvanized steel.
2. Comply with ASTM A36.
3. Type: Threaded.

2.02 FLEXIBLE DUCTS

A. Manufacturers:

1. Hart & Cooley Inc.
2. Substitutions: As specified in Section 016000 - Product Requirements.

B. Description:

1. Two-ply vinyl film supported by helical-wound spring steel wire.
2. Pressure Rating: 10-inch wg positive and 1.0-inch wg negative.
3. Maximum Velocity: 4,000 fpm.
4. Temperature Range: Minus 10 to plus 160 degrees F.

C. Description:

1. UL-labeled black polymer film supported by helical-wound spring steel wire.
2. Pressure Rating: 4-inch wg positive and 0.5-inch wg negative.
3. Maximum Velocity: 4,000 fpm.
4. Temperature Range: Minus 20 to plus 175 degrees F.

D. Description:

1. UL-labeled multiple layers of aluminum laminate supported by helical-wound spring steel wire.
2. Pressure Rating: 10-inch wg positive and 1.0-inch negative.
3. Maximum Velocity: 4,000 fpm.
4. Temperature Range: Minus 20 to plus 210 degrees F.

E. Description:

1. UL 181, Class 1, aluminum laminate and polyester film with latex adhesive supported by helical-wound spring steel wire.
2. Pressure Rating: 10-inch wg positive and 1.0-inch wg negative.
3. Maximum Velocity: 4,000 fpm.
4. Temperature Range: Minus 20 to plus 210 degrees F.

F. Description:

1. UL 181, Class 0, interlocking spiral of aluminum foil.
2. Pressure Rating: 8-inch wg positive or negative.
3. Maximum Velocity: 5,000 fpm.
4. Temperature Range: Minus 100 to plus 432 degrees F.

2.03 SINGLE-WALL, SPIRAL ROUND DUCTS

A. Manufacturers:

1. McGill AirFlow LLC.
2. Spiro Metal Inc.
3. Substitutions: As specified in Section 016000 - Product Requirements.

B. Description:

1. UL 181, Class 1, round spiral lockseam duct.
2. Material: Galvanized steel.

C. Minimum Duct Wall Thicknesses:

1. Diameter 2 to 14 Inches: 26 gage.
2. Diameter 16 to 26 Inches: 24 gage.
3. Diameter 28 to 36 Inches: 22 gage.
4. Diameter 38 to 50 Inches: 20 gage.
5. Diameter 52 to 60 Inches: 18 gage.

D. Minimum Fittings Wall Thicknesses:

1. Diameter 2 to 14 Inches: 24 gage.
2. Diameter 16 to 26 Inches: 22 gage.
3. Diameter 28 to 36 Inches: 20 gage.
4. Diameter 38 to 50 Inches: 20 gage.
5. Diameter 52 to 60 Inches: 18 gage.

2.04 CASINGS

A. Fabricate casings according to SMACNA 1966 and construct for indicated operating pressures.

B. Doors:

1. Reinforce access door frames with steel angles tied to horizontal and vertical plenum supporting angles.
2. Furnish hinged access doors where indicated or required for access to equipment for cleaning and inspection.

2.05 DUCTWORK FABRICATION

A. Rectangular Ducts:

1. According to SMACNA 1966 and as indicated on Drawings.
2. Provide duct material, gages, reinforcing, and sealing for indicated operating pressures.

B. Round Ducts:

1. According to SMACNA 1966 and as indicated on Drawings.
2. Seams: Longitudinal.
3. Provide duct material, gages, reinforcing, and sealing for indicated operating pressures.

C. Tees, Bends, and Elbows:

1. Minimum Radius:

a. 1-1/2 times centerline duct width.
b. If not possible or if rectangular elbows are used, provide turning vanes.

2. If acoustical lining is indicated, furnish turning vanes of perforated metal with glass-fiber insulation.

D. Divergence:

1. Increase duct sizes gradually, not exceeding 15 degrees of divergence wherever possible.
2. Upstream of Equipment: Maximum 30 degrees.
3. Downstream of Equipment: Maximum 45 degrees.

E. Welding:

1. Continuously Welded Round and Oval Duct Fittings: Two gages heavier than duct gages according to SMACNA 1966.
2. Cemented Slip Joints:

a. Minimum 4 inches.
b. Brazed or electric welded.

3. Prime coat welded joints.

F. Takeoffs:

1. Provide standard 45-degree lateral wye takeoffs.
2. If not possible due to space limitations, provide 90-degree conical tee connections.

G. Sealing:

1. Seal joints between duct sections and duct seams with welds, gaskets, mastic adhesives, mastic plus embedded fabric systems, or tape.
2. Sealants, Mastics, and Tapes: Comply with UL 181A and provide products bearing appropriate UL 181A markings.

2.06 ACCESSORIES

A. Hangers and Supports:

1. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.
2. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.
3. Strap and Rod Sizes:

    a. Comply with SMACNA 1966.
    b. Glass-Fiber-Reinforced Ducts: Comply with SMACNA 1884.

4. Trapeze and Riser Supports:

    a. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
    b. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
    c. Supports for Aluminum Ducts: Aluminum or galvanized steel, coated with zinc chromate.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.

B. Verify sizes of equipment connections before fabricating transitions.

3.02 PREPARATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.

B. Obtain manufacturer's inspection and acceptance of fabrication and installation at beginning of installation.

C. Install temporary closures of metal or taped PE on open ductwork to prevent construction dust from entering ductwork system.

3.03 INSTALLATION

A. Install and seal ducts according to SMACNA 1966.

B. Glass-Fiber-Reinforced Ducts: Comply with SMACNA 1884.

C. Use crimp joints with or without bead or beaded sleeve couplings for joining round duct sizes 8 inches and smaller.

D. Hanger and Supports:

1. Fabricate and support ducts according to SMACNA 1884 and 1966.
2. Threaded Rods: Provide double nuts and lock washers.
3. Building Attachments:

    a. Provide concrete inserts or structural-steel fasteners appropriate for construction materials to which hangers are attached.
    b. If possible, install concrete inserts before placing concrete.
    c. Powder-Actuated Concrete Fasteners:

        1) Use only for slabs more than 4 inches thick.
        2) Install after concrete is placed and completely cured.
        3) Do not use powder-actuated concrete fasteners for seismic restraints.

4. Hanger Spacing:

    a. Comply with SMACNA 1884 and 1966.
    b. Install hangers and supports within 24 inches (610 mm) of each elbow and within 48 inches (1.2 m) of each branch intersection.
    c. Extend strap supports down both sides of ducts and turn under bottom at least 1 inch (25 mm).
    d. Secure hanger to sides and bottom of ducts with sheet metal screws.

5. Hangers Exposed to View: Provide threaded rod and angle or channel supports.
6. Vertical Ducts:

    a. Support with steel angles or channel secured to sides of duct with welds, bolts, sheet metal screws, or blind rivets.
    b. Support at each floor and at maximum intervals of 16 feet (4.9 m).

7. Upper Attachments:

    a. Attach to structures.
    b. Selection and Sizing: Provide pull-out, tension, and shear capacities as required for supported loads and building materials.

8. Penetrations:

    a. Avoid penetrations of ducts with hanger rods.
    b. If unavoidable, provide airtight rubber grommets at penetrations.

E. Outdoor Ductwork: Protect ductwork and ductwork supports, linings, and coverings from weather.

F. Exhaust Outlet Locations:

1. Minimum Distance from Property Lines: 3 feet.
2. Minimum Distance from Building Openings: 3 feet.
3. Minimum Distance from Outside Air Intakes: 10 feet.

G. Installation Standards: Install Work according to NFPA 5000, 2021 version.

H. Interface with Other Work:

1. Install openings in ductwork as required to accommodate thermometers and controllers.
2. Install pitot tube openings for testing of systems, complete with metal can with spring device or screw to prevent air leakage.
3. If openings are provided in insulated ductwork, install insulation material inside metal ring.
4. Connect diffusers or light troffer boots to low-pressure ducts with 5-foot maximum length of flexible duct held in place with strap or clamp.
5. Connect outlets to supply ducts with 5-foot maximum length of flexible duct; do not use flexible duct to change direction.

3.04 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements: Requirements for inspecting and testing.

B. Section 017000 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.

3.05 CLEANING

A. Section 017000 - Execution and Closeout Requirements: Requirements for cleaning.

B. Clean duct system and force air at high velocity through duct to remove accumulated dust.

C. To obtain sufficient airflow, clean one half of system completely before proceeding to other half.

D. Vacuuming:

1. Clean duct systems with high-power vacuum machines.
2. Install access openings into ductwork for cleaning purposes.

E. Protect sensitive equipment with temporary filters or bypass during cleaning.

3.06 ATTACHMENTS

A. Ductwork Pressure Class Schedule:

1. Constant Volume Supply: 1-inch wg, regardless of velocity.
2. Variable-Volume, Variable-Temperature Supply: 1-inch wg , regardless of velocity.
3. Variable-Air-Volume Supply - Downstream of VAV Boxes: 1-inch wg, regardless of velocity.
4. Variable-Air-Volume Supply - Upstream of VAV Boxes: 2-inch wg.
5. Supply - Heating Systems: 1/2-inch wg.
6. Supply - Systems with Cooling Coils: 1/2-inch wg.
7. Buried Supply or Return: 1/2-inch wg.
8. Return and Relief: 1/2-inch wg.
9. General Exhaust: 1/2-inch wg.
10. Dishwasher Exhaust: 1/2-inch wg.
11. Fume Hood Exhaust: 2-inch wg.
12. Emergency Generation Ventilation: 1/2-inch wg.

END OF SECTION

SECTION 23 3300

AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Back-draft dampers.
2. Volume control dampers.
3. Flexible duct connections.

B. Related Sections:

1. Section 230900 - Instrumentation and Control for HVAC: Execution and Product requirements for connection and control of Combination Smoke and Fire Dampers for placement by this section.
2. Section 230923 - Direct-Digital Control System for HVAC: Execution and Product requirements for connection and control of Combination Smoke and Fire Dampers for placement by this section.
3. Section 230953 - Pneumatic and Electric Control System for HVAC: Execution and Product requirements for connection and control of Combination Smoke and Fire Dampers for placement by this section.
4. Section 233100 - HVAC Ducts and Casings: Requirements for duct construction and pressure classifications.
5. Section 260503 - Equipment Wiring Connections: Execution requirements for connection of electrical Combination Smoke and Fire Dampers specified by this section.

1.02 REFERENCES

A. Air Movement and Control Association International, Inc.:

1. AMCA 500 - Test Methods for Louvers, Dampers, and Shutters.

B. ASTM International:

1. ASTM E1 - Standard Specification for ASTM Thermometers.

C. National Fire Protection Association:

1. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems.

2. NFPA 92A - Recommended Practice for Smoke-Control Systems.

D. Sheet Metal and Air Conditioning Contractors:

1. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.

1.03 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers

C. Product Data: Submit data for shop fabricated assemblies and hardware used.

D. Product Data: Submit for the following. Include where applicable electrical characteristics and connection requirements.
1. Backdraft dampers.
2. Flexible duct connections.
3. Volume control dampers.

E. Product Data: For [fire dampers] [smoke dampers] [combination fire and smoke dampers] submit the following:

1. Include UL ratings, dynamic ratings, leakage, pressure drop and maximum pressure data.
2. Indicate materials, construction, dimensions, and installation details.
3. Damper pressure drop ratings based on tests and procedures performed in accordance with AMCA 500.

F. Manufacturer's Installation Instructions: Submit for Fire and Combination Smoke and Fire Dampers.

G. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.04 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.

1.05 QUALITY ASSURANCE

A. Dampers tested, rated and labeled in accordance with the latest UL requirements.

B. Damper pressure drop ratings based on tests and procedures performed in accordance with AMCA 500.

C. Perform Work in accordance with NFPA 5000, 2021 version.

D. Maintain one copy of each document on site.

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.07 PRE-INSTALLATION MEETINGS

A. Section 013000 - Administrative Requirements: Pre-installation meeting.

B. Convene minimum one week prior to commencing work of this section.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Product storage and handling requirements.

B. Protect dampers from damage to operating linkages and blades.

C. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer and material.

D. Storage: Store materials in a dry area indoor, protected from damage.

E. Handling: Handle and lift dampers in accordance with manufacturer's instructions. Protect materials and finishes during handling and installation to prevent damage.

1.09 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.10 COORDINATION

A. Section 013000 - Administrative Requirements: Coordination and project conditions.

B. Coordinate Work where appropriate with building control Work.

1.11 WARRANTY

A. Section 017000 - Execution and Closeout Requirements: Product warranties and product bonds.

B. Furnish five year manufacturer warranty for duct accessories.

1.12 EXTRA MATERIALS

A. Section 017000 - Execution and Closeout Requirements: Spare parts and maintenance products.

PART 2 - PRODUCTS

2.01 BACK-DRAFT DAMPERS

A. Manufacturers:

1. Carnes Company.
2. FAMCO.
3. Greenheck Fan Corporation.
4. Ruskin Company.
5. TAMCO (T. A. Morrison & Co. Inc.).
6. Substitutions: Section 016000 - Product Requirements.

B. Furnish materials in accordance with fusible link.

C. Product Description: Multi-Blade, back-draft dampers: Parallel-action, gravity-balanced, Galvanized. Blades, maximum 6 inch width, with felt or flexible vinyl sealed edges. Blades linked together in rattle-free manner with 90-degree stop, steel ball bearings, and plated steel pivot pin. Furnish dampers with adjustment device to permit setting for varying differential static pressure.

2.02 VOLUME CONTROL DAMPERS

A. Manufacturers:

1. Air Balance; a division of MESTEK, Inc.
2. Carnes Company.
3. McGill AirFlow LLC.
4. Nailor Industries Inc.
5. Ruskin Company.
6. Substitutions: [Section 016000 - Product Requirements] [Not Permitted].

B. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated on Drawings.

C. Splitter Dampers:

1. Material: Same gage as duct to 24 inches size in both dimensions, and two gages heavier for sizes over 24 inches.
2. Blade: Fabricate of sheet metal to streamline shape, secured with continuous hinge or rod.
3. Operator: Minimum 1/4 inch diameter rod in self-aligning, universal joint action, flanged bushing with set screw.

D. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 x 72 inch. Assemble center and edge crimped blades in prime coated or galvanized frame channel with suitable hardware

E. End Bearings: Except in round ductwork 12 inches and smaller, furnish end bearings. On multiple blade dampers, furnish oil-impregnated nylon or sintered bronze bearings. Furnish closed end bearings on ducts having pressure classification over 2 inches wg.

F. Quadrants:

1. Furnish locking, indicating quadrant regulators on single and multi-blade dampers.
2. On insulated ducts mount quadrant regulators on standoff mounting brackets, bases, or adapters.
3. Where rod lengths exceed 30 inches furnish regulator at both ends.

2.03 FLEXIBLE DUCT CONNECTIONS

A. Manufacturers:

1. Duro Dyne Inc.
2. Flexmaster U.S.A., Inc.
3. Hart & Cooley Inc.
4. Labconco Corporation.

B. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.

C. Connector: Fabric crimped into metal edging strip.

1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric conforming to NFPA 90A, minimum density 30 oz per sq yd.

D. Leaded Vinyl Sheet: Minimum 0.55 inch thick, 0.87 lbs. per sq ft, 10 dB attenuation in 10 to 10,000 Hz range.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Section 013000 - Administrative Requirements: Coordination and project conditions.

B. Verify rated walls are ready for fire damper installation.

C. Verify ducts and equipment installation are ready for accessories.

D. Check location of air outlets and inlets and make necessary adjustments in position to conform to architectural features, symmetry, and lighting arrangement.

3.02 INSTALLATION.

A. Install in accordance with NFPA 90A and follow SMACNA HVAC Duct Construction Standards - Metal and Flexible. Refer to Section 233100 for duct construction and pressure class.

B. Install Work in accordance with NFPA 5000, 2021 version.

C. Install back-draft dampers on exhaust fans or exhaust ducts nearest to outside.

3.03 DEMONSTRATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for demonstration and training.

B. Demonstrate re-setting of fire dampers to Owner's representative.

END OF SECTION

SECTION 23 3400

HVAC FANS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Upblast propeller roof fans.
2. Ceiling fans.
3. Combination kitchen hood supply and exhaust fans.
4. Energy recovery ventilator.

1.2 REFERENCES

A. American Bearing Manufacturers Association:

1. ABMA 9 - Load Ratings and Fatigue Life for Ball Bearings.
2. ABMA 11 - Load Ratings and Fatigue Life for Roller Bearings.

B. Air Movement and Control Association International, Inc.:

1. AMCA 99 - Standards Handbook.
2. AMCA 204 - Balance Quality and Vibration Levels for Fans.
3. AMCA 210 - Laboratory Methods of Testing Fans for Aerodynamic Performance Rating.
4. AMCA 300 - Reverberant Room Method for Sound Testing of Fans.
5. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data.

C. American Refrigeration Institute:

1. ARI 1060 - Air-to-Air Energy Recovery Ventilation Equipment Certification Equipment Program.

D. ASTM International:

1. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Windborne Debris in Hurricanes.

E. National Electrical Manufacturers Association:

1. NEMA MG 1 - Motors and Generators.

2. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

F. Underwriters Laboratories Inc.:

1. UL 705 - Power Ventilators.

1.3 PERFORMANCE REQUIREMENTS

A. Wind-Borne Debris Loads: Design louvers located within 30 feet (9.144 m) of grade to withstand ASTM E1996; large missile impact test.

1.4 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate size and configuration of fan assembly, mountings, weights, ductwork and accessory connections.

C. Product Data: Submit data on each type of fan and include accessories, fan curves with specified operating point plotted, power, RPM, sound power levels for both fan inlet and outlet at rated capacity, electrical characteristics, and connection requirements.

D. Manufacturer's Installation Instructions: Submit fan manufacturer instructions.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.5 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.

B. Operation and Maintenance Data: Submit instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.6 QUALITY ASSURANCE

A. Performance Ratings: Conform to AMCA 210 and bear AMCA Certified Rating Seal.

B. Sound Ratings: AMCA 301, tested to AMCA 300 , and bear AMCA Certified Sound Rating Seal.

C. UL Compliance: UL listed and labeled, designed, manufactured, and tested in accordance with UL 705.

D. Balance Quality: Conform to AMCA 204.

E. Energy Recovery Unit Wheel Energy Transfer Rating: Meet ARI 1060.

F. Perform Work in accordance with NFPA 5000, 2021 version.

G. Maintain one copy of each document on site.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years' documented experience.

B. Installer: Company specializing in performing Work of this section with minimum three years' documented experience approved by manufacturer.

1.8 PRE-INSTALLATION MEETINGS

A. Section 013000 - Administrative Requirements: Pre-installation meeting.

B. Convene minimum one week prior to commencing work of this section.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Product storage and handling requirements.

B. Protect motors, shafts, and bearings from weather and construction dust.

1.10 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.11 WARRANTY

A. Section 017000 - Execution and Closeout Requirements: Product warranties and product bonds.

B. Furnish five year manufacturer's warranty for fans.

1.12 MAINTENANCE SERVICE

A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance service.

B. Furnish service and maintenance of fans for five years from Date of Substantial Completion.

C. Include systematic examination, adjustment, and lubrication of fans, and controls checkout and adjustments. Repair or replace parts in accordance with manufacturer's operating and maintenance data. Use parts produced by manufacturer of original equipment.

D. Perform work without removing fans from service during building normal occupied hours.

E. Provide emergency call back service at all hours for this maintenance period.

F. Maintain locally, near Place of the Work, adequate stock of parts for replacement or emergency purposes. Have personnel available to ensure fulfillment of this maintenance service, without unreasonable loss of time.

G. Perform maintenance work using competent and qualified personnel under supervision of manufacturer or original installer.

H. Do not assign or transfer maintenance service to agent or subcontractor without prior written consent of Owner.

1.13 EXTRA MATERIALS

A. Section 017000 - Execution and Closeout Requirements: Spare parts and maintenance products.

PART 2 - PRODUCTS

2.1 UPBLAST CENTRIFUGAL ROOF FANS

A. Manufacturers:

1. Acme Engineering & Manufacturing Corp.
2. Aerovent; a division of Twin City Fan Companies, Ltd.
3. Airmaster Fan Company.
4. Fantech.
5. FloAire National.
6. Greenheck Fan Corporation.
7. Hartzell Fan Incorporated.
8. PennBarry.

B. Fan Unit: Upblast type. Spun aluminum housing with grease tray; resilient mounted motor; aluminum wire bird screen; square base to suit roof curb with continuous curb gaskets.

C. Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheave selected so required rpm is obtained with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.

D. Roof Curb: High self-flashing with continuously welded seams and factory installed nailer strip.

E. Accessories:

1. Backdraft Damper: Gravity actuated, aluminum multiple blade construction, felt edged with offset hinge pin, nylon bearings, blades linked
2. Fan speed controller.

2.2 CEILING FANS

A. Manufacturers:

1. Acme Engineering & Manufacturing Corp.
2. Airmaster Fan Company.
3. American Coolair Corporation.
4. Fantech.
5. Greenheck Fan Corporation.
6. Loren Cook Company.

B. Centrifugal Fan Unit: Direct driven with resilient mounted motor, gravity backdraft damper in discharge opening, integral outlet duct collar. [

C. Motor: Open drip proof type with permanently lubricated sealed bearings and thermal overload protection.

2.3 COMBINATION KITCHEN HOOD SUPPLY AND EXHAUST FANS

A. Manufacturers:

1. FloAire National.
2. Greenheck Fan Corporation.

B. Exhaust Fan:

1. Refer to Upblast Centrifugal Roof Fans elsewhere in this Section.

C. Supply Fan:

1. Fan Unit: Belt driven, double width, double inlet centrifugal blower, galvanized steel housing with galvannealed finish; resilient mounted motor; square base to suit roof curb.

2. Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheave selected so required rpm is obtained with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.

D. Master Control Panel: Factory wired to disconnect switch for supply fan and disconnect switch for exhaust fan. Furnish with fused magnetic starters, overload protection, wiring terminals and weatherproof housing. Furnish with 120 volt control circuit transformer.

E. Fresh Air Intake Section: Constructed of galvanized steel. Size as indicated on Drawings. Galvanized steel duct support at end of intake duct.

F. Curb Cap: Galvanized steel, welded construction. Fits over roof curb to accommodate supply fan and exhaust fan. Insulate with 1-1/2 inch , 3 pcf density fiberglass insulation. Furnish vented extension for exhaust fan. Comply with NFPA 96 for fan spacing and vertical separation.

G. Damper: Motor operated, aluminum multiple blade construction, felt edged with offset hinge pin, nylon bearings, blades linked.

2.4 ENERGY RECOVERY VENTILATOR

A. Manufacturers:

1. Carnes Company.
2. Fantech.
3. Greenheck Fan Corporation.
4. Loren Cook Company.
5. RenewAire LLC.
6. Ruskin Company.
7. SEMCO, LLC; part of FlaktGroup.

B. Fans: Individual supply and exhaust fans.

C. Motors: permanently lubricated sealed type bearings with ABMA 9 life at 200,000 hours.

D. Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheave selected so required rpm is obtained with sheaves set at mid-position.

E. Filter: 2 inch thick 30 percent efficient pleated type located in both supply and exhaust air streams.

F. Electrical: Components factory wired for single point power connection. Control panel UL listed with access door.

G. Accessories:
1. Gravity operated dampers factory installed [and wired] in supply and exhaust air streams.
2. Disconnect Switch: NEMA 250 enclosure.
3. Vibration isolators.

H. Controls: Furnish unit with the following:

1. Dirty Filter Sensor: Activates warning light.
2. Rotation Sensor: Sends signal to remote indicator when wheel stops.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 013000 - Administrative Requirements: Coordination and project conditions.

B. Verify roof curbs are installed and dimensions are as [shown on shop drawings] [instructed by manufacturer].

3.2 INSTALLATION

A. Suspended Fans: Install flexible connections between fan and ductwork. Ensure metal bands of connectors are parallel with minimum one inch flex between ductwork and fan while running.

B. Provide sheaves required for final air balance.

C. Install Work in accordance with NFPA 5000, 2021 version.

3.3 MANUFACTURER'S FIELD SERVICES

A. Section 014000 - Quality Requirements: Requirements for manufacturer's field services.

B. Furnish services of factory trained representative for minimum of one day to start-up, calibrate controls, and instruct Owner on operation and maintenance.

3.4 CLEANING

A. Section 017000 - Execution and Closeout Requirements: Requirements for cleaning.

B. Vacuum clean coils and inside of fan cabinet.

3.5 DEMONSTRATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for demonstration and training.

B. Demonstrate fan operation and maintenance procedures.

3.6 PROTECTION OF FINISHED WORK

A. Section 017000 - Execution and Closeout Requirements: Requirements for protecting finished Work.

B. Do not operate fans for until ductwork is clean, filters in place, bearings lubricated, and fan has been test run under observation.

END OF SECTION

SECTION 23 3700

AIR OUTLETS AND INLETS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Diffusers.
2. Registers
3. Grilles.

1.02 REFERENCES

A. Air Movement and Control Association International, Inc.:

1. AMCA 500 - Test Methods for Louvers, Dampers, and Shutters.

B. American Society of Heating, Refrigerating and Air-Conditioning Engineers:

1. ASHRAE 70 - Method of Testing for Rating the Performance of Air Outlets and Inlets.

C. Sheet Metal and Air Conditioning Contractors:

1. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.

1.03 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit sizes, finish, and type of mounting. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

C. Samples: Submit two of each required air outlet and inlet type.

D. Test Reports: Rating of air outlet and inlet performance.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.04 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents: Record actual locations of air outlets and inlets.

1.05 QUALITY ASSURANCE

A. Test and rate diffuser, register, and grille performance in accordance with ASHRAE 70.

B. Test and rate louver performance in accordance with AMCA 500.

C. Perform Work in accordance with NFPA 5000, 2021 version.

D. Maintain one copy of each document on site.

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years' documented experience and with service facilities within 100 miles of Project.

1.07 MOCK-UP

A. Section 014000 - Quality Requirements: Mock-up requirements.

B. Construct typical interior ceiling module with supply and return air outlets.

C. Locate where indicated on Drawings.

D. Incorporate accepted mock-up as part of Work.

E. Remove mock-up when directed by Architect/Engineer.

1.08 PRE-INSTALLATION MEETINGS

A. Section 013000 - Administrative Requirements: Pre-installation meeting.

B. Convene minimum one week prior to commencing work of this section.

1.09 WARRANTY

A. Section 017000 - Execution and Closeout Requirements: Product warranties and product bonds.

B. Furnish five year manufacturer's warranty for air outlets and inlets.

1.10 EXTRA MATERIALS

A. Section 017000 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Furnish 10 percent extra air outlets and inlets.

PART 2 - PRODUCTS

2.01 RECTANGULAR CEILING DIFFUSERS

A. Manufacturers:

1. A-J Manufacturing Co., Inc.
2. Anemostat Products; a Mestek company.
3. Carnes Company.
4. Hart & Cooley Inc.
5. Kees, Inc.
6. Krueger-HVAC; brand of Johnson Controls International plc, Global Products.
7. METALAIRE, Inc.
8. Nailor Industries Inc.
9. Price Industries.
10. Titus; brand of Johnson Controls International plc, Global Products.
11. Tuttle & Bailey; brand of Johnson Controls International plc, Global Products.

B. Type: Square diffuser to discharge air in 360 degree pattern.

C. Frame: Surface mount type.

D. Fabrication: Aluminum with baked enamel.

E. Accessories: opposed-blade damper.

2.02 CEILING SLOT DIFFUSERS

A. Manufacturers:

1. Air Research Diffuser Products, Inc.
2. Anemostat Products; a Mestek company.
3. Carnes Company.
4. Hart & Cooley Inc.
5. Kees, Inc.
6. Krueger-HVAC; brand of Johnson Controls International plc, Global Products.
7. METALAIRE, Inc.
8. Nailor Industries Inc.
9. Price Industries.
10. Titus; brand of Johnson Controls International plc, Global Products.

11. Tuttle & Bailey; brand of Johnson Controls International plc, Global Products.

B. Fabrication: Aluminum extrusions

C. Plenum: Integral, galvanized steel, insulated.

2.03 WALL SUPPLY REGISTERS/GRILLES

A. Manufacturers:

1. A-J Manufacturing Co., Inc.
2. Anemostat Products; a Mestek company.
3. Carnes Company.
4. Hart & Cooley Inc.
5. Kees, Inc.
6. Krueger-HVAC; brand of Johnson Controls International plc, Global Products.
7. METALAIRE, Inc.
8. Nailor Industries Inc.
9. Price Industries.
10. Titus; brand of Johnson Controls International plc, Global Products.
11. Tuttle & Bailey; brand of Johnson Controls International plc, Global Products.

B. Damper: Integral, gang-operated opposed blade type with removable key operator, operable from face.

2.04 WALL EXHAUST AND RETURN REGISTERS/GRILLES

A. Manufacturers:

1. A-J Manufacturing Co., Inc.
2. Anemostat Products; a Mestek company.
3. Carnes Company.
4. Hart & Cooley Inc.
5. Kees, Inc.
6. Krueger-HVAC; brand of Johnson Controls International plc, Global Products.
7. METALAIRE, Inc.
8. Nailor Industries Inc.
9. Price Industries.
10. Titus; brand of Johnson Controls International plc, Global Products.
11. Tuttle & Bailey; brand of Johnson Controls International plc, Global Products.

B. Damper: Integral, gang-operated, opposed-blade type with removable key operator, operable from face.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify inlet and outlet locations.

B. Verify ceiling/wall systems are ready for installation.

3.02 INSTALLATION

A. Install diffusers to ductwork with airtight connection.

B. Install balancing dampers on duct take-off to diffusers, grilles, and registers, whether or not dampers are furnished as part of diffuser, grille, and register assembly. Refer to Section 233300.

C. Paint visible portion of ductwork behind air outlets and inlets matte black. Refer to Section 099000.

D. Do not locate air registers, diffusers or grilles in floors of toilet or bathing rooms.

3.03 INTERFACE WITH OTHER PRODUCTS

A. Check location of outlets and inlets and make necessary adjustments in position to conform to architectural features, symmetry, and lighting arrangement.

END OF SECTION

SECTION 23 8126

SPLIT-SYSTEM AIR-CONDITIONERS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Air handling unit.
2. Condensing unit.

1.02 REFERENCES

A. Air-Conditioning and Refrigeration Institute:

1. ARI 210/240 - Unitary Air-Conditioning and Air-Source Heat Pump Equipment.
2. ARI 270 - Sound Rating of Outdoor Unitary Equipment.
3. ARI 340/360 - Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment.
4. ARI 365 - Commercial and Industrial Unitary Air-Conditioning Condensing Units.

B. American Society of Heating, Refrigerating and Air-Conditioning Engineers:

1. ASHRAE 52.1 - Gravimetric and Dust-Spot Procedures for Testing Air-Cleaning Devices Used in General Ventilation for Removing Particulate Matter.
2. ASHRAE 90.1 - Energy Standard for Buildings Except Low-Rise Residential Buildings.

C. ASTM International:

1. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.

D. National Electrical Manufacturers Association:

1. NEMA MG 1 - Motors and Generators.

E. NFPA:

1. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems.

1.03 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit data indicating:

1. Cooling and heating capacities.
2. Dimensions.
3. Weights.
4. Rough-in connections and connection requirements.
5. Duct connections.
6. Electrical requirements with electrical characteristics and connection requirements.
7. Controls.
8. Accessories.

C. Manufacturer's Installation Instructions: Submit assembly, support details, connection requirements, and include start-up instructions.

D. Manufacturer's Certificate: Certify the split system meets or exceeds ASHRAE energy efficiency requirements.

E. Manufacturer's Field Reports: Submit start-up report for each unit.

1.04 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents: Record actual locations of controls installed remotely from units.

C. Operation and Maintenance Data: Submit manufacturer's descriptive literature, operating instructions, installation instructions, and maintenance and repair data.

1.05 QUALITY ASSURANCE

A. Performance Requirements: Energy Efficiency Rating (EER) not less than prescribed by ASHRAE 90.1 when used in combination with compressors and evaporator coils when tested in accordance with AHRI 210/240.

B. Cooling Capacity: Rate in accordance with AHRI 210/240.

C. Sound Rating: Measure in accordance with ARI 270.

D. Insulation and adhesives: Meet requirements of NFPA 90A.

E. Perform Work in accordance with NFPA 5000, 2021 version.

F. Maintain one copy of each document on site.

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.

B. Installer: Company specializing in performing Work of this Section with minimum three years' documented experience approved by manufacturer.

1.07 PRE-INSTALLATION MEETINGS

A. Section 013000 - Administrative Requirements: Pre-installation meeting.

B. Convene minimum one week prior to commencing Work of this Section.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Accept units and components on site in factory protective containers, with factory shipping skids and lifting lugs. Inspect for damage.

C. Comply with manufacturer's installation instruction for rigging, unloading and transporting units.

D. Protect units from weather and construction traffic by storing in dry, roofed location.

1.09 COORDINATION

A. Section 013000 - Administrative Requirements: Requirements for coordination.

B. Coordinate installation of condensing units with concrete pads.

C. Coordinate installation of air handling units with building structure.

1.10 WARRANTY

A. Section 017000 - Execution and Closeout Requirements: Requirements for warranties.

B. Furnish five-year manufacturer's warranty for compressors.

1.11 MAINTENANCE SERVICE

A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance service.

B. Furnish service and maintenance of equipment for one year from Date of Substantial Completion. Include maintenance items as shown in manufacturer's operating and maintenance data, including filter replacements, fan belt replacement, and controls checkout and adjustments.

C. Furnish 24-hour emergency service on breakdowns and malfunctions for this maintenance period. Furnish capability of response time within 3 hours.

1.12 MAINTENANCE MATERIALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance materials.

B. Furnish one set for each unit of filters.

PART 2 - PRODUCTS

2.01 SPLIT SYSTEM AIR CONDITIONING UNITS

A. Manufacturers:

1. Carrier Global Corporation.
2. Comfort-Aire; a division of Heat Controller, Inc.
3. Daikin Applied.
4. Lennox Industries, Inc.; Lennox International.
5. Luxaire; brand of Johnson Controls International plc, Building Solutions North America.
6. Rheem Manufacturing Company; Heating and Cooling Products.
7. Trane.
8. YORK; brand of Johnson Controls International plc, Building Solutions North America.

B. Product Description: Split system consisting of air handling unit and condensing unit including cabinet, evaporator fan, refrigerant cooling coil, compressor, refrigeration circuit, condenser, air filters, controls, air handling unit accessories, condensing unit accessories, and refrigeration specialties.

2.02 AIR HANDLING UNIT

A. Configuration: Up flow air delivery.

B. Cabinet:

1. Panels: Constructed of galvanized steel with baked enamel finish. Access Panels: Located on both sides of unit. Furnish with duct collars on inlets and outlets.
2. Insulation: Factory applied to each surface to insulate entire cabinet.

C. Evaporator Fan: Forward curved centrifugal type, resiliently mounted with high efficiency motor complying with NEMA MG1, Type 1. Motor permanently lubricated with built-in thermal overload protection.

D. Evaporator Coil: Constructed of copper tubes expanded onto aluminum fins. Factory leak tested under water. Removable, PVC construction, double-sloped drain pan with piping connections on both sides.

E. Refrigeration System: refrigeration circuits controlled by factory installed thermal expansion valve.

F. Air Filters: 1-inch-thick glass fiber disposable media in metal frames.

G. Air Handling Unit Accessories:

1. Discharge Plenum: with construction and finish matching unit casing. Integral grille of aluminum construction and adjustable louvers.
2. Mounting Subbase with construction and finish matching unit casing.
3. Vibration Isolators

2.03 CONDENSING UNIT

A. General: Factory assembled and tested air cooled condensing units, consisting of casing, compressors, condensers, coils, condenser fans and motors, and unit controls.

B. Unit Casings: Exposed casing surfaces constructed of galvanized steel with manufacturer's standard baked enamel finish. Designed for outdoor installation and complete with weather protection for components and controls, and complete with removable panels for required access to compressors, controls, condenser fans, motors, and drives.

C. Compressor: Single refrigeration circuit with scroll type compressors, resiliently mounted, with positive lubrication, and internal motor overload protection.

D. Condenser Coil: Constructed of copper tubing mechanically bonded to aluminum fins, factory leak and pressure tested.

E. Controls: Furnish operating and safety controls including high and low pressure cutouts. Control transformer. Furnish magnetic contactors for compressor and condenser fan motors.

F. Condenser Fans and Drives: Direct drive propeller fans statically and dynamically balanced. Wired to operate with compressor. Permanently lubricated ball bearing type motors with built-in thermal overload protection. Furnish high efficiency fan motors.

G. Condensing Unit Accessories: Furnish the following accessories:
1. Time delay relay.
2. Anti-short cycle timer.
3. Disconnect switch.
4. Vibration isolators.
5. Condenser Coil Guard: Condenser fan openings furnished with PVC coated steel wire safety guards.
6. Suction and discharge pressure gauges.

H. Refrigeration specialties: Furnish the following:

1. Charge of compressor oil.
2. Holding charge of refrigerant.
3. Replaceable core type filter drier.
4. Liquid line sight glass and moisture indicator.
5. Shut-off valves on suction and liquid piping.
6. Liquid line solenoid valve.
7. Charging valve.
8. Oil level sight glass.
9. Crankcase heater.
10. Hot gas muffler.
11. Pressure relief device.

I. Refrigerant: Furnish charge of refrigerant R-410A.

2.04 CONTROLS

A. Thermostat: Seven-day programmable electronic space thermostat with single stage heating and single stage cooling with manual changeover and heating setback and cooling setup capability. Furnish system selector switch heat-off-cool and fan control switch, auto-on.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Section 013000 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify concrete pad for condensing unit is ready for unit installation.

3.02 INSTALLATION - AIR HANDLING UNIT

A. Install air handling units on vibration isolators. Refer to Section 230548.

B. Install floor mounted units on concrete housekeeping pads at least 3-1/2 incheshigh and 6 incheswider than unit. Refer to Section 033000.

C. Connect air handling units to supply and return ductwork with flexible connections. Refer to Section 233300.

D. Install condensate piping with trap and route from drain pan to condensate drainage system. Refer to Section 232113.

E. Install components furnished loose for field mounting.

F. Install connection to electrical power wiring in accordance with Section 260583.

G. Install Work in accordance with NFPA 5000, 2021 version.

3.03 INSTALLATION - CONDENSING UNIT

A. Install condensing units on vibration isolators. Refer to Section 230548.

B. Install units on concrete foundations. Refer to Section 033000.

C. Install refrigerant piping from unit to condensing unit. Install refrigerant specialties furnished with unit.

D. Evacuate refrigerant piping and install initial charge of refrigerant.

E. Install electrical devices furnished loose for field mounting.

F. Install control wiring between air handling unit, condensing unit, and field installed accessories.

G. Install connection to electrical power wiring in accordance with Section 260583.

H. Install Work in accordance with NFPA 5000, 2021 version.

3.04 MANUFACTURER'S FIELD SERVICES

A. Section 014000 - Quality Requirements: Requirements for manufacturer's field services.

B. Furnish initial start-up and shutdown during first year of operation, including routine servicing and checkout.

3.05 CLEANING

A. Section 017000 - Execution and Closeout Requirements: Requirements for cleaning.

B. Vacuum clean coils and inside of unit cabinet.

C. Install temporary filters during construction period. Replace with permanent filters at Substantial Completion.

3.06 DEMONSTRATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for demonstration and training.

B. Demonstrate air handling unit operation and maintenance.

C. Demonstrate starting, maintenance, and operation of condensing unit.

D. Furnish services of manufacturer's technical representative for one hour day to instruct Owner's personnel in operation and maintenance of units. Schedule training with Owner, provide at least 7 days' notice to Architect of training date.

3.07 PROTECTION OF FINISHED WORK

A. Section 017000 - Execution and Closeout Requirements: Requirements for protecting finished Work.

B. Do not operate air handling units until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.

END OF SECTION

SECTION 23 8200

CONVECTION HEATING AND COOLING UNITS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Electric unit heaters.

B. Related Sections:

1. Section 230513 - Common Motor Requirements for HVAC Equipment: Product requirements for motors for placement by this Section.
2. Section 260583 - Wiring Connections: Execution requirements for electric connection to units specified by this Section.

1.02 REFERENCES

A. Air-Conditioning and Refrigeration Institute:

1. ARI 410 - Forced-Circulation Air-Cooling and Air-Heating Coils.

1.03 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate cross sections of cabinets, grilles, bracing and reinforcing, and typical elevations. Indicate schedules of equipment and enclosures typically indicating length and number of pieces of element and enclosure, corner pieces, end caps, cap strips, access doors, pilaster covers.

C. Product Data: Submit coil and frame configurations, dimensions, materials, rows, connections, and rough-in dimensions. Submit mechanical and electrical service locations, capacities and accessories, or optional items.

D. Samples: Submit one sample of each radiation cabinet detailed.

E. Manufacturer's Installation Instructions: Submit assembly, support details, and connection requirements.

F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.04 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents: Record actual locations of components and locations of access doors in radiation cabinets required for access to valves.

C. Operation and Maintenance Data: Submit manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listings.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with State standard.

B. Maintain one copy of each document on site.

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.

B. Installer: Company specializing in performing Work of this Section with minimum three years' documented experience approved by manufacturer.

1.07 PREINSTALLATION MEETINGS

A. Section 013000 - Administrative Requirements: Preinstallation meeting.

B. Convene minimum one week prior to commencing Work of this Section.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Product storage and handling requirements.

B. Accept units on site in factory packing. Inspect for damage. Store under roof.

C. Protect coil fins from crushing and bending by leaving in shipping cases until installation, and by storing indoors. Protect coils from entry of dirt and debris with pipe caps or plugs.

1.09 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.10 WARRANTY

A. Section 017000 - Execution and Closeout Requirements: Product warranties and product bonds.

B. Furnish five-year manufacturer's warranty.

1.11 EXTRA MATERIALS

A. Section 017000 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Furnish two sets of filters.

PART 2 - PRODUCTS

2.01 ELECTRIC UNIT HEATERS

A. Manufacturers:

1. Markel Products; TPI Corporation.
2. Marley Engineered Products.
3. Modine Manufacturing Company.
4. QMark; Marley Engineered Products.
5. Trane.

B. Assembly: UL listed and labeled assembly with terminal box and cover, and controls.

C. Cabinet: 0.0478-inch thick steel with easily removed front panel with integral air outlet and inlet grilles.

D. Element Hangers: Quiet operating, ball bearing cradle type providing unrestricted longitudinal movement, on enclosure brackets.

E. Fan: Direct-drive propeller type, statically and dynamically balanced, with fan guard.

F. Motor: Permanently lubricated, sleeve bearings for horizontal models; ball bearings for vertical models.

G. Control: Separate fan speed switch and thermostat heat selector switch, factory wired, with switches built-in behind cover. Furnish thermal overload.

PART 3 - EXECUTION

3.01 EXAMINATION

A. For recessed units, verify recess dimensions are correct size.

B. Verify wall construction is ready for installation.

C. Verify ductwork is ready for installation.

D. Verify concealed blocking and supports are in place and connections are correctly located.

3.02 INSTALLATION

A. Install electric heating equipment including devices furnished by manufacturer but not factory-mounted. Furnish copy of manufacturer's wiring diagram submittal. Install electrical wiring in accordance with manufacturer's submittals and Section 260583.

END OF SECTION

SECTION 26 0000

ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 DESCRIPTION

A. The work under this Section shall conform to the requirements of "Division 1, General Requirements," "Conditions of the Contract" and "Supplementary Conditions." Specific attention is called to the "Division 26 General Requirements" located in Section 26001.

B. It is the intent of these Specifications for the Contractor to provide an electrical system complete, fully operational, fully adjusted, and ready for use.

1.02 PARTIAL LIST OF WORK NOT INCLUDED IN DIVISION 26

A. Equipment pads:

B. Installing access doors:

C. Painting (except as otherwise specified herein):

D. Furnishing of motors: Division 23.

E. Furnishing of individual motor controllers that are factory-mounted and integral parts of pieces of equipment: Division 23.

F. Furnishing, installing, and connecting telephone wiring, cables, and equipment:

G. Compaction testing:

H. Division 23 shall furnish and install control wiring and conduit for the following:

1. Motor control interlock wiring for automatic temperature control of pumps, WCU's, AHU's, and fans including chilled, heating hot water and condenser water system controls, flow switches, pressure differential controls, compression tank alarms, nitrogen pressurization system, water treatment system, etc.
2. Sewage ejector and sump pump controls and alarms.
3. Water system controls and alarms including but not limited to: Domestic water pumps, fire pumps, house pumps, surge tanks, etc.
4. Wiring for central alarm panel (CAP).

5. Interlocking of pumps, WCU's, AHU's, and fans to building management system relays.
6. Connection of all safety devices, alarms and control wiring for air compressors including controls for air dryers.
7. Any control wiring for thermostats, direct digital controls, control valves, dampers, ATC cabinets, etc. for automatic temperature control. Control wiring shall be considered both "line 120 & 277V." and "low" voltage wiring.
8. Any control wiring not listed above shall be furnished and installed under Division 26, including but not limited to conduit, other raceway components, and control wiring between water meters and remotely mounted water meters.

I. Unit Pricing and Budgetary Cost Estimate
1. The Contractor shall provide unit prices and budgetary cost estimates as indicated in the Architectural Documents, as specified herein, and as indicated on the Drawings.

1.03 DIVISION COORDINATION REQUIREMENTS

A. It shall be the responsibility of the Electrical Contractor to review the following additional specification sections to determine the complete scope of Division 26 work:

1. Section 230900 Instrumentation and Control for HVAC
2. Section 283111 Digital Addressable Fire Alarm System

PART 2 - PRODUCTS

2.01 EQUIPMENT

A. General: All equipment shall be new, of the capacity and type specified herein, and as shown on the Drawings. Equipment shall be of a listed manufacturer and model number and shall be in accordance with the space limitations of the project.

B. Single Source: To maximize ease of maintenance and part replacement, equipment of a similar nature shall be provided by a single manufacturer.

C. Approved Equal: Equipment and materials selected by the Contractor within the context of "equal as approved by the Engineer", "approved equal", "equivalent as determined by the Engineer" and similar terminology shall be submitted to the Engineer for review, approval and inclusion into the Contract Documents prior to the finalization of the contract between the Owner and the Contractor, and prior to the shop drawing submittal phase of the Project. All equipment and materials submitted to the Engineer under the terms of "approved equal" during the shop drawing phase of the Project without prior review and approval shall be returned to the Contractor without review under the status of "No Action".

2.02 MATERIAL

A. All material required for a complete and proper installation shall be as specified and as selected by the Contractor subject to the approval of the Architect. Material shall be new, listed and approved by UL, and bear the inspection label if subject to such approval.

PART 3 - EXECUTION

3.01 CONDITIONS

A. Inspection: Prior to proceeding with the work of this Division, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence. Verify that the work of this Division may be completed in strict accordance with all pertinent codes and regulations, the reviewed shop drawings, and the manufacturers' recommendations.

B. Discrepancies: In the event of discrepancy, immediately notify the Owner's Representative. Do not proceed in areas of discrepancy until all such discrepancies have been resolved. If there is a discrepancy between the Drawings and the Specifications, the Specifications shall typically govern. However, any discrepancy of this type shall be immediately brought to the attention of the Owner's Representative for formal interpretation prior to proceeding with the work.

C. Interpretation of Documents: Any and all contractual requirements may be indicated solely on the Drawings, solely in the Specifications, in both the Specifications and on the Drawings, in reference standards indicated in the Specifications and/or in the Owner's and Contractor's Contract. If Contract requirements are indicated in both the Specifications and the Drawings, the Contractor shall comply with both requirements unless the requirements are mutually exclusive of each other. If Contract requirements are indicated in both a reference standard and the Specifications, the more stringent requirement shall apply. Any and all contractual requirements shall be interpreted within the overall context of the complete scope of work. All materials, equipment, systems and installation methods shall be suitable for the intended service, coordinated with other trades and be complete, fully operational, adjusted, tested and ready for use by the Owner.

3.02 INSTALLATION OF EQUIPMENT

A. Locations: Install all equipment in the locations shown on the approved shop drawings, except where specifically approved otherwise on the job by the Architect and/or Owner's Representative.

B. Interferences: Avoid interference with structure and with work of other trades, while preserving adequate headroom and clearing all doors and passageways to the approval of the Architect and/or Owner's Representative.

C. Where busway is installed on a job, Electrical Contractor shall coordinate location early with other trades. Horizontal runs of bus shall be run above all piping and ductwork so as to maximize clear headroom below busway and maintain manufacturer's recommended access clearances to all sides of busway. All section joints shall be accessible.

D. Inspection: Check each piece of equipment in the system for defects. Verify that all parts are properly furnished and installed, function properly, and that all adjustments have been made.

3.03 CONNECTIONS TO EQUIPMENT

A. Mechanical Equipment: The Contractor shall make final electrical connections to all items of mechanical equipment, including all motors and unit heaters for a complete and operational system.

B. Elevator Connections: The Contractor shall make final connections to the elevator control panel(s) and provide the required outlets for the elevator accessories as required by the elevator manufacturer. Padlocking hardware will be provided for all circuit breakers or disconnects in elevator machine room(s). Enclosed fused disconnects or circuit breakers will be provided for all elevators within the elevator machine room "in sight" of elevator controllers. Contractor shall provide a 160^{o} heat detector independent of the fire alarm system hard wired to the 120 volt standby power system with 120V., 20A. rated contact(s). Control wiring shall be provided such that upon activation of detector, a standby powered 120V., 20A. circuit shall be completed which shall shunt trip "off" main line power to elevator controllers. All work for the elevator installation shall be in accordance with applicable requirements of the ANSI Standard Safety Code for Elevators, Dumbwaiters, Escalators, and Moving Walks, A17.1, published by the American Society of Mechanical Engineers.

3.04 CLOSING-IN OF UNINSPECTED WORK

A. General: Do not allow or cause any of the work of this Division to be covered up or enclosed until it has been inspected, tested, and approved by the Architect and/or Owner's Representative and by the authorities having jurisdiction.

B. Uncovering: Should any of the work of this Division be covered up or enclosed before it has been completely inspected, tested and approved, the Contractor shall provide all services, labor, materials and equipment necessary to uncover such work without additional cost to the Owner. After the work has been completely inspected, tested, and approved, the Contractor shall provide all services, labor, materials and equipment to make all repairs necessary to restore the work to its original and proper condition at no additional cost to the Owner.

3.05 COOPERATION WITH OTHER TRADES

A. Coordinate and cooperate with other trades in order that all systems in the scope of the Contract may be installed in the best arrangement. Coordinate and cooperate as required with all other trades which share space in common areas and maximize the access to each system and their respective components.

3.06 CLEANING

A. It is the intent of these Specifications that all work, including the inside of equipment, be left in a clean condition. All construction dirt shall be removed from material and equipment. Level of cleanliness shall be defined as "broom" clean unless noted otherwise. All exterior surfaces of Division 26 equipment shall be wiped down and cleaned of all dust and dirt. All interior surfaces of electrical equipment including but not limited to switchboards, motor controllers, and panelboards shall be wiped down and vacuum cleaned. Surfaces to be painted shall be cleaned and prepared in accordance with architectural division of the contract and as noted in other sections herein.

3.07 COMPLETENESS

A. It is the intent of these Specifications to provide a complete system. Completeness shall mean not only that all material and equipment have been installed properly, but that all material and equipment have been installed and have been adjusted, and that, in the opinion of the Architect, all material and equipment are operating as designed.

3.08 ADJUSTMENT OF CONTROLS

A. The Contractor shall provide the personnel and equipment to completely adjust the controls to the satisfaction of the Architect. At the completion of the project, the Architect will arrange a meeting at the job site to allow the Contractor to demonstrate the proper operation of the electrical controls.

3.09 NOISE

A. It is the intent of these Specifications to provide a system free from objectionable noise. Any equipment that is generating objectionable noise, in the opinion of the Architect, shall be corrected and other noises shall be dampened as directed.

END OF SECTION

SECTION 26 0001

GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. General

1. The work required under this Section shall conform to the requirements of "Division 1, General Requirements," Conditions of the “Contract" and "Supplementary Conditions".

B. Work Included

1. The work included in this Section consists of the general requirements for the work more specifically described in Division 23 and Division 26 where referenced.

C. Definitions

1. The Contractor shall provide all supervision, labor, material, equipment, machinery, and any and all other items necessary to complete the mechanical and electrical systems. All items of equipment are specified in the singular; however, the Contractor shall provide the number of items of equipment as indicated on the Drawings, and as required for complete systems.

D. Intent

1. It is the intention of these Specifications and Drawings to call for finished work, tested, and ready for operation. Wherever the word "provide" is used, it shall mean "furnish and install complete and ready to use."
2. All labor, materials, apparatus, and appliances essential to the complete functioning of the systems described and/or indicated herein, or which may be reasonably implied as essential whether mentioned in the Contract Drawings and Specifications or not, shall be furnished and installed by the Contractor.
3. In cases of doubt as to the Work intended, or in the event of need for explanation thereof, the Contractor shall request supplementary instructions from the Architect.

E. Codes, Rules, Regulations, Permits and Fees

1. The Contractor shall give all necessary notices, obtain all permits and pay all government sales taxes, fees, and other costs, including utility connections or

extensions, in connection with the Contractor's work; file all necessary plans, prepare all documents and obtain all necessary approvals of all governmental departments having jurisdiction; obtain all required certificates of inspection of the Contractor's work and deliver same to the Architect before request for acceptance and final payment for work.

2. The Contractor shall comply with the most recently revised versions of all applicable laws, rules, regulations, and ordinances of Federal, State, and Local Authorities. Modifications required by the above said Authorities shall be made without additional charge to the Owner.
3. All equipment shall comply with all applicable requirements of laws, codes, ordinances, legislation, etc., of all Federal, State and Local Authorities, whether indicated on the Contract Documents or not.
4. Where Contract Drawings and Specifications requirements are in excess of Code requirements and are permitted under the Code, the Contract Drawings and Specifications shall govern.
5. All rules and regulations of the State Fire Insurance Regulatory Body, Underwriters Laboratories, the Local Building Code, Americans with Disabilities Act (ADA), and National Electrical Code (NEC), shall be complied with whether indicated in the Contract Drawings and Specifications or not.
6. Where alterations to and/or deviations from the Contract Drawings and Specifications are required by the above authorities, report the requirements to the Architect and secure Architect's approval before starting the alterations.

1.02 QUALITY ASSURANCE

A. Surveys and Measurements

1. The Contractor shall base all measurements, both horizontal and vertical, from established bench marks. All work shall agree with these established lines and levels. Verify all measurements at site and check the correctness of same as related to the work.
2. Should the Contractor discover any discrepancy between actual measurements and those indicated, which prevents following good practice or the intent of the Drawings and Specifications, the Contractor shall notify the Architect, and shall not proceed with the work until instruction has been received from the Architect.

B. Drawings

1. Drawings are diagrammatic and indicate the general arrangement of systems and work included in the Contract. Drawings are not to be scaled. The Architectural Drawings and Details shall be examined for exact location of fixtures and equipment. Where they are not definitely located, this information shall be obtained from the Owner's Representative.

2. The Contractor shall follow Drawings in laying out work and check Drawings of other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points. Where headroom or space conditions appear inadequate, the Owner's Representative shall be notified before proceeding with installation.
3. If directed by the Owner's Representative, the Contractor shall, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper execution of the work, if such directions are made prior to the performance of the affected work.

C. Cooperation with Other Trades

1. The Subcontractors shall give full cooperation to other trades and shall furnish in writing to the General Contractor any information necessary to permit the work of all trades to be installed satisfactorily and with the least possible interference or delay.
2. Where Division 23 and 26 work will be installed in close proximity to, or will interfere with work of other trades, coordination among trades in working out space conditions to make a satisfactory adjustment shall be accomplished.
3. The Contractor shall prepare composite shop drawings and sections at a suitable scale not less than 1/4" = 1'0", clearly showing how work of all affected trades is to be installed. If work is installed before coordinating with other trades, or so as to cause any interference with work of other trades, then the necessary changes in work shall be made to correct the condition without extra charge.
4. The Contractor shall obtain and transmit between affected trades, all necessary templates, patterns, setting plans, and shop details for the proper installation of work and for the purpose of coordinating adjacent work.
5. Where busway is installed on a job, Electrical Contractor shall coordinate location early with other trades. Horizontal runs of bus shall be run above all piping and ductwork so as to maximize clear headroom below busway and maintain manufacturer's recommended access clearances to all sides of busway. All section joints shall be accessible.

D. Protection

1. The Contractor shall protect all work and material from damage by the Contractors' work or workmen, Subcontractors' work or workmen, and shall be liable for all damage thus caused.
2. The Contractor shall be responsible for work and equipment until work is final inspected, tested, and accepted; the Contractor shall protect work against theft, injury or damage; and shall carefully store material and equipment received on site which are not immediately installed. The Contractor shall close open ends of work with temporary covers or plugs during storage and construction to prevent entry of obstructing material.

E. Material and Workmanship

1. Work shall be executed in strict accordance with the best practice of the trades in a thorough, substantial, workmanlike manner by competent workmen.
2. The Contractor shall furnish the services of a full-time, experienced superintendent, who shall be constantly in charge of the installation of the work, together with all skilled workmen, fitters, metal workers, welders, helpers, and laborers required to unload, transfer, erect, connect, adjust, start, operate, and test each system.

F. Manufacturer's Recommendations

1. With exceptions as specified and/or indicated on the Drawings or in the Specifications, apply, install, connect, erect, use, clean, and condition manufactured articles, materials, and equipment in accordance with manufacturer's current printed recommendations. Keep copies of such printed recommendations at job site and make them available as required. When product conditions are not covered by the manufacturer's printed recommendations, at the discretion of the owner's representative, it may be necessary for the manufacturer's representative to review the product conditions and provide written supplemental recommendations to address the special situation.

G. Space Limitations

1. Equipment has been chosen which will fit into the physical spaces provided and indicated, allowing ample room for access, servicing, removal and replacement of parts, etc. Adequate space shall be allowed for clearance in accordance with the Code requirements and the requirements of the local inspection department.
2. In the preparation of Drawings, a reasonable effort to accommodate approved equipment manufacturer's space requirements has been made. However, since space requirements and equipment arrangement vary according to each manufacturer, the responsibility for initial access and proper fit rests with the Contractor. The Contractor will be responsible for obtaining approvals from the Engineer and Local Authority where equipment the Contractor is providing on the Project differs in size or space considerations from that shown on Contract Documents.
3. Physical dimensions and arrangements of equipment to be installed shall be subject to the Architect's review.

H. Coordination Between Divisions 23 and 26

1. The Division 26 contractor shall cooperate with the general contractor and the Division 23 contractor to provide coordination between the Division 23 and 26 trades. For all equipment requiring electrical service provided under Division 23, it shall be the responsibility of the Division 26 contractor to acquire from the Division 23 contractor the electrical characteristics of the actual equipment to be provided. Should there be a discrepancy between the electrical service characteristics of the equipment to be provided and what is indicated on the documents, the contractor shall obtain written

direction from the Owner's representative prior to proceeding. This coordination and transfer of information shall take place prior to the purchasing and installation of the electrical service.

1.03 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

A. After the Contract is awarded, but prior to proceeding with the Work requiring final reviewed shop drawings, product data and samples, the Contractor shall obtain complete shop drawings, product data and samples from the manufacturers, suppliers, vendors, Subcontractors, and Sub-Subcontractors for all materials, systems and equipment specified herein; and submit data and details of such materials, systems and equipment for review by the Architect and Engineer. Prior to submittal of the shop drawings, product data and samples to the Architect and Engineer, the Contractor shall review and certify that the shop drawings, product data and samples are in compliance with Contract Documents. Further, the Contractor shall check all materials and equipment after their arrival on the job site and verify their compliance with the Contract Documents. A minimum period of two weeks, exclusive of transmittal time, will be required in the Engineer's office each time a shop drawing, product data and/or samples are submitted or resubmitted for review. This time period shall be considered by the Contractor when scheduling the Work.

B. The Architect's approval and Engineer's review of shop drawings, product data, and samples shall not relieve the Contractor of the responsibility for dimensions or errors that may be contained therein, or for deviations from requirements in the Contract Documents. It shall be clearly understood that the Engineer's noting some errors but overlooking others does not grant the Contractor permission to proceed in error. Regardless of any information contained in the shop drawings, product data and samples, the Contract Documents shall govern the Work and are neither waived nor superseded in any way by the review of shop drawings, product data and samples.

C. Before submitting shop drawings, product data and samples the Contractor shall certify that data and details set forth on each shop drawing, product data, or samples for each item of equipment and materials complies with the Contract Documents for this Project. Such certification shall be made by the Owner, a Partner, a Corporate Officer of the Contractor, or by a person duly authorized to sign binding agreements for the Contractor. Unless certified, shop drawings, product data and samples will not be reviewed, and will be returned unchecked to the Contractor. Certifications shall be in the form of rubber stamp impressions which state:

I hereby certify that this shop drawing,
product data, and/or sample has been
checked prior to submittal and that it
complies in all respects with the
requirements of the Contract Documents

and physical space limitations for the Project.

(Name of the Electrical Subcontractor)

Signed: _____

Position: _____

Date: _____

D. The Contractor shall submit shop drawings, product data and/or samples equipment and other items listed in Section 26900 and for any other equipment for which such submittals may be required in various Sections of the Specifications.

E. Inadequate or incomplete shop drawings, product data and/or samples will not be reviewed by the Architect or the Engineer and shall be returned to the Contractor for resubmittal.

F. The Contractor shall observe the following rules when submitting shop drawings, product data and samples:

1. Each shop drawing shall indicate in the lower right hand corner, and each product data brochure shall indicate on the front cover the following: title of the sheet or brochure; name and location of the Project; names of the Architect and Engineer, Contractor, Subcontractor, manufacturer, supplier, vendor; the date of submittal; and the date of each correction and revision. So far as is practical, each shop drawing, product data and/or sample shall bear a cross-reference note to the page number or numbers of sheets of the Drawings and/or Specifications showing the Work. Unless the above information is included, the submittal will be returned for resubmittal.
2. Shop drawings shall be done in an easily legible scale and shall contain sufficient plans, elevations, sections and schematics to clearly describe the apparatus. Drawings shall be prepared by an engineer-draftsman skilled in this type of work. All bus duct layouts and similar shop drawings shall be drawn to at least 1/4" = 1'-0" scale. The Contractor shall submit shop drawings as described below. Shop drawings which do not comply with these requirements will be returned for resubmittal.

    a. The submittal shall consist of two prints and one sepia of the shop drawing. The Architect and Engineer will each retain one print and should the shop drawing receive a "RESUBMIT" status the sepia will be returned to the Contractor. Should the submittal receive a status of "FINAL REVIEW" or "REVIEWED, EXCEPTIONS NOTED", the sepia will be returned to the Contractor with the appropriate action indicated. Should the submittal be market "RESUBMIT", it shall be resubmitted in accordance with the Contract Documents. If marked "FINAL REVIEW", no

resubmittal is required, and if marked "REVIEWED, EXCEPTIONS NOTED", documentation in the form of a letter or complete resubmittal of shop drawing shall be forwarded to the Owner and Engineer for record purposes only.

b. If the copy stamped "FINAL REVIEW" is altered for any reason after it has been stamped, the "FINAL REVIEW" shall automatically be voided.

c. All work shall be done in accordance with shop drawings stamped "FINAL REVIEW" or "REVIEWED, EXCEPTIONS NOTED", insofar as these are in agreement with the Contract Documents. Wherever differences occur between the shop drawings and the Contract Documents, the Contract Documents shall govern the Work.

3. Product data to be submitted shall be published by the manufacturers and shall contain complete and detailed engineering and dimensional information. The Contractor shall submit product data as described below. Product data which does not comply with these requirements will be returned for resubmittal.

a. Product data submitted shall contain only information relevant to the particular equipment or materials to be furnished. The Contractor shall not submit catalogs which describe several different items in addition to those items to be used, unless all irrelevant information is clearly marked out, or unless relevant information is clearly marked. Product data from each manufacturer shall be identified and submitted separately.

b. The submittal shall consist of product data from each manufacturer. Product data will be returned marked "FINAL REVIEW", "REVIEWED, EXCEPTIONS NOTED", or "RESUBMIT". If stamped "RESUBMIT", the product data so marked shall be returned and the submittal repeated in accordance with Contract Documents. If marked "REVIEWED, EXCEPTIONS NOTED" the submittal shall be corrected as noted and returned for Owner's and Engineer's permanent record. If marked "FINAL REVIEW" no additional submittal will be required.

c. If the product data stamped "FINAL REVIEW" are altered for any reason after they have been stamped, the "FINAL REVIEW" shall automatically be voided.

d. All work shall be done in accordance with product data stamped "FINAL REVIEW" or "REVIEWED, EXCEPTIONS NOTED" insofar as these are in agreement with the Contract Documents. Wherever differences occur between the product data and Contract Documents, the Contract Documents shall govern the Work.

e. The Contractor shall submit eight (8) copies of each product data brochure. The Architect and Engineer will each retain one copy of the submittal and six (6) copies will be returned to the Contractor.

G. Equipment Deviations

1. Where the Contractor proposes to use an item of equipment other than that specified or detailed on the drawings, which requires any redesign of the structure, partitions, foundations, piping, wiring or any other part of the mechanical, electrical, structural, or

architectural layout, all such redesign, and all new drawings and detailing required therefore, shall be prepared by the Contractor at the Contractor's own expense as approved by the Owner's Representative.

2. Where such approved deviation requires a different quantity and arrangement of ductwork, piping, wiring, conduit and equipment from that specified or indicated on the Drawings, the Contractor shall furnish and install any such ductwork, piping, structural supports, insulation, controllers, motors, starters, electrical wiring, and conduit, and any other additional equipment required by the system, at no additional cost to the owner.

1.04 WARRANTY

A. All equipment supplied for this Contract shall be free from defects in material, workmanship, and title, and shall be of the kind and quality described herein. If it appears within one year from date of building final acceptance by the Owner that the equipment does not meet the warranties specified above, the Contractor shall correct any defect, including nonconformance with these Specifications, at the Contractor's option, either by repairing any defective part or parts or by making available at the Contractor's plant a repaired or replacement part.

1.05 CONFERENCE PRIOR TO START OF WORK

A. Immediately upon the award of this Contract, but prior to commencing any Work, the Contractor together with designated major Subcontractors shall confer with the Owner's Representative, the Architect and Engineer concerning the Work under this Contract.

B. Contractors and Subcontractors attending this meeting shall include but not be limited to the following: General; Mechanical; Plumbing; Fire Protection; Automatic Temperature Controls and Building Management; Sheet Metal; Insulation; Electrical; Fire Alarm; and Testing, Balancing and Adjusting. Contractor and Subcontractor representatives shall be familiar with the Drawings, Specifications and shop drawing submittal requirements and be prepared to intelligently discuss the project requirements.

C. The conference shall be as determined by Architect.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Materials and equipment shall be new and in good condition. The commercially standard items of equipment and the specific names mentioned herein are intended to identify standards of quality and performance necessary for the proper functioning of the Work.

B. Since manufacturing methods vary, reasonable minor variations are expected; however, performance and material requirements specified are the minimum standards acceptable. The Engineer retains the right to judge equality of equipment that deviates from the Contract Drawings and Specifications.

2.02 EQUIPMENT PADS AND ANCHOR BOLTS

A. Concrete pads for various pieces of equipment will be provided under another Division. Pads shall be provided in main switchboards rooms, all areas with floors below grade, penthouse equipment rooms and electrical closets and any other locations as shown on the drawings. This shall include floor mounted equipment, equipment mounted on legs and pipe support stands. Unless otherwise noted, equipment pads shall generally conform to the shape of the piece of equipment it serves with a minimum 3" margin around the equipment and supports. Pads shall be a minimum of 4" high and made of a minimum 28 day, 2500 psi concrete reinforced with 6" x 6" 6/6 gauge welded wire mesh. Tops and sides of pad shall be troweled to smooth finishes, equal to those of the floors, with all external corners bull-nosed to a 3/4" radius. Shop drawings stamped "FINAL REVIEW" or "REVIEWED EXCEPTIONS NOTED" shall be used for dimensional guidance in sizing pads.

B. Unless otherwise noted furnish and install galvanized anchor bolts for all equipment placed on concrete equipment pads or on concrete slabs. Minimum dimension between anchor bolts and edge of slab shall not be less than 3". Bolts shall be of the size, type and number recommended by the manufacturer of the equipment and shall be located by means of suitable templates provided by the equipment manufacturer.

2.03 EQUIPMENT MOUNTING/SUPPORT DEVICES

A. All floor, wall or ceiling mounting/support devices shall be factory fabricated devices as provided by the equipment manufacturer for the intended application unless otherwise indicated on the Drawings.

B. The Engineer retains the right to judge the quality of the design, application, and installation of all field fabricated mounting/support devices using steel angle, steel channels, Uni-Strut, brackets, all-thread rods, etc. Any mounting or support devices that will rust, corrode or in the opinion of the Engineer become unsightly or a maintenance problem will not be acceptable.

C. Support devices not factory finished shall be hot dipped galvanized or properly primed and painted with a minimum of two coats of rust inhibiting paint. Refer to the Architectural Painting Systems for additional requirements.

D. All-thread rods shall be galvanized, or cadmium plated.

E. All plywood used as mounting boards in association with Division 26, unless specified otherwise by the Architect, shall be APA C-D plugged interior 5/8" to 3/4". All plywood used shall be painted (front, back and edges) with a minimum of one prime coat and one finish coat prior to equipment installation. Refer to the Architectural Specifications for additional requirements. Color shall be determined by the Architect.

2.04 ACCESS DOORS

A. Wherever access is required through walls, ceilings or fire-rated enclosures to concealed equipment installed under this Division, the Contractor shall furnish a hinged access door and frame as follows:

1. Drywall construction--Milcor Style DW.
2. Finished acoustical tile ceiling--Milcor Style AT.
3. Finished plaster ceiling--Milcor Style AP.
4. Finished plaster walls or ceramic tile--Milcor Style M.
5. Plaster or masonry walls and ceilings outside offices and in other finished areas exposed to view--Milcor Style K or M.
6. Access doors shall be "B" label fire construction where required.
7. Access doors shall be installed under another Division.
8. No access door shall be installed until location and type have been approved by the Architect.

2.05 ESCUTCHEONS

A. Furnish and install heavy chrome-plated or nickel-plated steel plates of approved pattern on all conduit passing through walls and ceilings in finished areas. Escutcheons shall be B & C No. 10 or approved equal with concealed hinges. Pattern shall be approved by the Architect.

PART 3 - EXECUTION

3.01 SCAFFOLDING, RIGGING, HOISTING

A. The Contractor shall furnish all scaffolding, rigging, hoisting, and services necessary for erection and delivery of any equipment and apparatus furnished to the job site. Remove same from job site when no longer required.

3.02 SLEEVES, CUTTING, AND PATCHING

A. The Contractor shall be responsible for the timely placing of openings and sleeves for all conduit passing through walls, partitions, beams, floors, and roof while the same are under construction. A conduit sleeve shall be one size larger than the size of conduit it serves, except where "Link Seal" casing seals are used in sleeves through walls below grade. Sleeves set in concrete floor construction shall be 18 gauge galvanized steel. Sleeves shall extend two inches above the finished floor. All conduit passing through concrete or masonry walls shall have standard weight galvanized steel sleeves. Sleeves shall be set flush with finished wall. Caulk around conduit penetrating floors and roof with sufficient layers of fire safing insulation and further seal off opening between conduit and sleeve with a fire rated non-hardening mastic. The fire rating shall equal rating of floor sleeve penetrates.

B. Sleeves penetrating walls below grade shall be standard weight black steel pipe with 1/4" thick steel plate secured to the pipe with continuous fillet weld. The plate shall be located in the middle of the wall and shall be four inches wider all around than the sleeve it encircles. The entire assembly shall be hot dipped galvanized after fabrication. Seal off annular opening between conduit and sleeve with "Link Seal" casing seal as manufactured by Thunderline Corporation, Wayne, Michigan. The sleeve shall be sized to accommodate the Thunderline casing seal. Casing seals shall be Series 300 for conduit sizes 3/4" through 4" and Series 400 for pipe conduit 5" and larger.

C. If holes and/or sleeves are not properly installed and cutting and patching becomes necessary, it shall be done at no expense to the Owner. The Contractor shall undertake no cutting or patching without first securing the Architect's written approval.

3.03 EXCAVATION AND BACKFILL

A. The Contractor shall make all necessary excavations, cutting of paving, concrete, etc., and do all backfilling and paving repairs necessary for the proper execution of the Work. Remove all dirt and debris out of and away from the building as directed. Backfill shall be mechanically compacted to a density of 95% of the maximum dry density at optimum moisture content as determined by the Standard Proctor Compaction Test.

B. Backfill shall be compacted and repairs to paving or concrete shall be accomplished to the satisfaction of the Architect and the Local Authorities.

C. See the various Sections of the Division for additional excavation and backfill requirements.

3.04 PAINTING

A. Painting, except as specified or indicated otherwise, shall be done under another Division. This Division shall cooperate with the other Division to determine the size of equipment, sizes and lengths of pipes, etc., to be painted.

B. Equipment furnished under this Division shall be factory-finished. If the factory finish is damaged during shipment, installation, etc., it shall be repainted subject to the Architect's approval.

3.05 DRAYAGE AND HAULING

A. Include all drayage, hauling, hoisting, and placement in the building of equipment specified herein. The Contractor shall be responsible for the timely introduction of equipment to the Project. If any item of equipment is received prior to the time it is required, the Contractor shall be responsible for its proper storage and protection until such time as it may be required. The Contractor shall pay for all cost of demurrage or storage.

3.06 IDENTIFICATION OF CIRCUITS AND EQUIPMENT

A. Electrical equipment shall be identified by means of nameplates permanently attached to the equipment. Refer to Section 26195 for additional requirements.

B. Cardholders and directory cards shall be provided for circuit identification in panelboards. Cardholder shall be located on inside of panel door. Directory cards shall be typewritten. Circuit descriptions shall include locations and names of items of equipment served.

C. Circuits and pull wires in empty conduit shall have tags attached to wiring at points where runs are interrupted at junction boxes or terminated in panels, boxes, etc. Feeder or branch circuit numbers shall be indicated.

D. Tag symbols shall correspond to the identifications on the record drawings.

3.07 PROHIBITED LABELS AND IDENTIFICATIONS

A. Prohibited Markings

1. Unless otherwise prohibited by applicable codes, in all public areas, tenant areas and similar locations within the Project, the inclusion or installation of any item, element of assembly which bears on any exposed surface any name, trademark, or other insignia which is intended to identify the manufacturer, the vendor, or other source(s) from which such object has been obtained, is prohibited. Also prohibited is the inclusion or

installation of any article which bears visible evidence that an insignia, name, label, or other device has been removed.

B. Exception

1. Required Underwriters Laboratory labels shall not be removed nor shall identifications specifically required under the various technical sections of the Specifications be removed.

3.08 EQUIPMENT NOISE AND VIBRATION

A. It is the intention to specify and for the Contractor to provide equipment and systems that, as defined herein, shall be quiet and free of apparent noise and vibration in operation.

B. It shall be the responsibility of the Contractor to obtain equipment that is quiet in operation as compared to the other available equipment of its size, capacity, and type, and to install equipment so that a minimum amount of noise and/or vibration is transmitted to the building.

C. Any additional precautions deemed necessary to provide a quiet installation shall be done as part of the Work of the Contractor, subject to review by the Engineer, without additional cost to the Owner. After the system is in operation, it shall be the responsibility of the Contractor to make any changes to equipment or Work installed as may be required to provide a system which is quiet in operation as defined herein.

3.09 DATE OF COMPLETION AND TESTING OF ELECTRICAL SYSTEMS

A. The date for the final acceptance test shall be sufficiently in advance of the Contract completion date to permit the execution of the test prior to the expiration of the Contract. Any adjustments and/or alterations which the final acceptance tests indicate as necessary for the proper functioning of all equipment shall be completed prior to the expiration of the Contract. Re-tests shall not relieve the Contractor of completion date responsibility. See individual Sections for extent of testing required.

B. The contractor shall provide a detailed schedule of completion indicating when each system is to be completed and outlining when tests will be performed.

3.10 OPERATING INSTRUCTION

A. The Contractor shall provide the services of a factory trained specialist to supervise the operation of all equipment specified herein and to instruct the Owner's operators for a five-day, eight hours per day, operating instruction period. The operating instruction period shall be defined as straight time working hours and shall not include nights, weekends, or travel time to and/or from the Project. See individual Sections for additional instructions by manufacturer's trained specialists.

B. The Owner shall be notified in writing at least five days before each operating instruction period begins. The Contractor shall not commence instruction period until the Owner has issued a written acceptance of the starting time.

3.11 OPERATING AND MAINTENANCE BOOKS

A. The Contractor shall provide operating instruction and maintenance data books for all equipment and materials furnished under this Division.

B. Submit six copies of operating and maintenance data books for review at least four weeks before final review of the Project. Assemble all data in a completely indexed volume or volumes and identify the size, model, and features indicated for each item. In addition, provide a copy of all submittals, instruction booklets, maintenance manuals, etc. in digital format (PDF) on a CD.

C. Maintenance instruction manuals shall include complete oiling, cleaning, and servicing data compiled in clearly and easily understandable form. Data shall show all model numbers of each piece of equipment, complete lists of replacement parts, motor ratings, and actual loads.

D. Include the following information where applicable:

1. Identifying name and mark number as indicated on the Drawings and in the Specifications.
2. Locations (where several similar items are used, provide a list).
3. Complete nameplate data.
4. Certified record drawings and "Final Reviewed" or completely corrected shop drawings.
5. Parts lists.
6. Performance curves and data.
7. Wiring Diagrams.

E. Manufacturers recommend operating and maintenance instructions with all nonapplicable information deleted.

3.12 3.12 RECORD DRAWINGS

A. The Contractor shall maintain on a daily basis at the project site a complete set of "Record Drawings" reflecting an accurate dimensional record of all buried or concealed work. In addition, the "Record Drawings" shall be marked to show the precise location of concealed work and equipment, and all changes and deviations in the electrical work from that shown on the Contract Documents. This requirement shall not be construed as authorization for the Contractor to make changes in the layout or work without definite instructions from the Architect. The "Record Drawings" shall consist of a set of black line prints of the Contract Drawings for this Division with the Engineer's seal and Engineer's firm name removed or blacked out. Prior to commencing work, the Contractor shall purchase from the Architect or Engineer a set of black line prints to be used for the "Record Drawings".

B. Record dimensions shall clearly and accurately delineate the Work as installed; locations shall be suitably identified by at least two dimensions to permanent structures.

C. The Contractor shall mark all "Record Drawings" on the front lower right hand corner with a rubber stamp impression that states the following:

"RECORD DRAWINGS (3/8 high letters)
To be used for recording Field
Deviations and Dimensional Data
Only”. (5/16" high letters)

D. Upon completion of work, the Contractor shall certify the "Record Drawings" for correctness by signing the following certification:

CERTIFIED CORRECT (3/8" high letters)

(Name of Electrical Subcontractor)

By: _____

Date: _____

E. Prior to final acceptance of the Work of this Division, the Contractor shall submit properly certified "Record Drawings" to the Architect for review and shall make changes, corrections, or additions as the Architect may require to the "Record Drawings".

3.13 FINAL REVIEW

A. At a time designated, the entire system shall be reviewed for compliance with the Contract Drawings and Specifications. The Contractor shall be present at this review.

B. The entire system shall be operating properly with all systems balanced and all controls adjusted. All prohibited markings shall be removed from all switchboards, panelboards, switches, etc., and the equipment shall be clean and in operating condition.

C. Certificates and Documents required herein shall be in order and presented to the Architect at least two weeks prior to the review.

D. After the review, any changes or corrections noted as necessary for the Work to comply with these Specifications and the Drawings shall be accomplished without delay in order to secure final acceptance of the Work.

E. The removal of panel covers, junction box covers, etc., for visual observation of the wire, busbars, etc., will not be required at the time of the Final Review if prior review is accomplished during construction.

END OF SECTION

SECTION 26 0500

COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Electrical equipment coordination and installation.
2. Sleeves for raceways and cables.
3. Sleeve seals.
4. Grout.
5. Common electrical installation requirements.

1.02 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

1.03 SCOPE

A. This Division and the accompanying electrical drawings cover furnishing all labor, equipment and materials and performing all operations in connection with the installation of complete electrical systems as documented on plans and specifications.

B. There are many interfaces between the work involved with this Division and the work in other Divisions, particularly with those divisions pertaining to HVAC and Plumbing. Be aware of the responsibilities at the interfaces. The exact locations of apparatus, fixtures, equipment and raceways shall be ascertained from all concerned and the work shall be laid out accordingly. In addition, coordinate with all equipment suppliers and other trades to verify the actual installation requirements prior to rough-ins.

C. The plans and specifications are considered cooperative and complimentary. Where one contradicts the other, notify the Architect/ Engineer for clarification prior to any installation.

D. All applicable portions of the General and Specific Conditions are included herein by reference.

1.04 CODES AND REGULATIONS

A. All work shall comply with all local laws, ordinances and regulations applicable to the electrical and fire alarm/life safety system installation, NFPA, OSHA, ANSI, SBC municipal ordinances governing electrical work, and with the requirements of the National Electrical Code (NEC) utilize the latest edition approved by the authority having jurisdiction (AHJ).

B. Where different sections of any of the aforementioned codes and regulations, the specifications or the plans require different materials, methods of construction, or other requirements, the most restrictive or stringent shall govern. In any conflict between a general provision and a special provision, the special provision shall govern.

C. Obtain all permits and licenses, and pay all fees as required for execution of the Contract. Arrange for necessary inspections required by the Architect, city, county, state and other authorities having jurisdiction (AHJ) and present certificates of approval to the Owner or his designated representative.

D. Under no circumstances will asbestos, or asbestos related materials, be allowed on this project.

E. Communicate with all required utility offices to meet utility schedules and regulations. Coordinate the local utility requirements with the requirements of these contract documents. Should conflicts arise, notify the Architect/Engineer immediately. Acquire services to avoid project delays. Conform to regulations of the local utility company with respect to metering, service entrance and service access.

1.05 SITE VISIT

A. All interested parties shall visit the site and thoroughly familiarize themselves with the local conditions and existing conditions which may affect the cost of the Work in advance of any project activity or submission of bids.

B. Where work under this Division requires extension, relocation, reconnection or modifications to the existing equipment or systems, the existing equipment or systems shall be restored to their original condition prior to completion of this Project.

C. No allowances will be made for lack of knowledge of job conditions which could reasonably be identified during site visit.

D. Verify the service entrance voltage and short circuit contribution with the serving power utility and provide written confirmation of same to the Architect prior to submitting shop drawings or ordering any materials for use in the building served. Provide service entrance equipment fully rated to interrupt the available fault current from the serving utility.

1.06 DRAWINGS AND SPECIFICATIONS

A. The Electrical Drawings are diagrammatic and are not intended to show the exact location of raceways, outlets, boxes, bends, sleeves, fire sealant, couplings or other such elements except where dimensions are noted. Provide all required offsets, extensions or pull boxes required for a fully coordinated and operational system.

B. The Drawings and Specifications shall both be considered as part of the Contract. Any work or material shown in one and omitted in the other, or which may fairly be implied by both or either, shall be provided in order to give a complete job.

C. Should conflicts exist between the Drawings and Specifications, notify the Architect/Engineer for clarification prior to installation.

D. Refer to the Civil, Architectural, Structural and Mechanical plans and shop drawings and details for dimensions and fit the work to conform to the details of building construction.

E. Review the drawings for door swings, cabinets, millwork, counters and other built-in equipment. Coordinate installation of the electrical equipment with structural systems and mechanical systems such that full maintenance access is provided.

F. All conduit and wiring shown on the Electrical Drawings shall be provided under this Division regardless of its function.

G. Review the drawings and specifications provided for other systems such as Sound System, CATV, Computer, Landscape, etc., for additional work which may be required under this Division. Provide service to and make connections to all such equipment requiring electrical service.

H. Equipment configuration is based upon one manufacturer's product. Where the equipment selected by the Contractor for use on this Project differs from the configuration shown, the Contractor shall be responsible for coordinating space requirements, connection arrangements, interfaces with mechanical and plumbing equipment and all other affected trades and providing access for future maintenance and repair. Submit proposed revisions for approval by the Architect/Engineer

1.07 EQUIPMENT CONNECTIONS

A. The horsepower, wattage (or amperes) of mechanical equipment indicated is the estimated requirement of equipment furnished under another Division. All wiring, protective devices and disconnect switches shall be of the voltage, size and ampacity required for the actual equipment installed, without increase or additional costs. In no case shall these items be of smaller capacity than permitted by National Electrical Code.

B. Coordinate with other trades and review the drawings of other divisions. Conform to UL Listing and nameplate requirements for equipment furnished. Such adjustments shall be subject to the approval of the Architect/Engineer.

C. Branch circuits supplying control panels and other equipment master and local unit locations and quantities shall be coordinated at the submittal stage and provided under this Division. Provide emergency power where required to accomplish emergency equipment operations in accordance with other Divisions requirements. All control wiring for plumbing and heating, ventilation and air conditioning systems shall be installed under their respective division. Review HVAC & Plumbing Division specifications and shop drawings for control systems to assure system compatibility between equipment furnished under this Division and system wiring and controls furnished under those Divisions.

D. Motor controllers shall be installed by this Division where automatic control of equipment is required, unless specified to be furnished as an integral part of packaged equipment. Power wiring to all motors and motor controllers and between motors and controllers shall be furnished under this Division.

E. For each electrical connection required, provide pressure connectors, terminals (lugs), electrical insulating tape, heat-shrinkable insulating tubing, cable ties, solderless wire connectors, and other items required to complete splices and terminations of the necessary types. Cover splices or terminations with electrical insulation equivalent to insulation of conductors terminated.

1.08 ELECTRICAL OUTAGE SCHEDULING

A. Electrical work requiring interruption of electrical power which would adversely affect the Owner's operation shall be done at times other than normal working hours. Coordinate with Owner to establish normal working hours for this facility.

1.09 COORDINATION

A. Coordinate arrangement, mounting, and support of electrical equipment:

1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
3. To allow right of way for piping and conduit installed at required slope.
4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed.

D. Coordinate sleeve selection and application with selection and application of firestopping.

1.10 AS-BUILT (RECORD) DRAWINGS

A. Maintain on the job site at all times during construction a set of "As-Built" drawings with all changes during construction marked thereon. This set shall be utilized for no other purpose. Include any addenda, change orders, field orders, project sketches or "marked-up" drawing prints as may be generated on the job site to assist in recording the changes.

B. The "As-Built" drawings shall show all changes and deviations from the Contract Drawings including relocation of outlets, conduit and equipment. Record final dimensioned locations of switchboards, panelboards, transformers, disconnect switches, etc. Make sufficient measurements to locate all new underground conduit. Show exact locations of new underground cable and conduits, both interior and exterior, fully dimensioned from building column lines or permanent exterior structures. These drawings shall be available for reference at the time of final inspection.

C. Submit red line as-builts to architect. Submission of Engineer's drawings for shop drawings and unaltered Engineer's drawings for "As-Built" will not be acceptable

1.11 MAINTENANCE AND CONSTRUCTION MANUALS

A. (FPA recommend to keep as part for close out docs) Submit to the Architect/Engineer, upon completion of the work and prior to final inspection, copies of maintenance and instruction manuals for equipment provided as outlined below:

1. Three sets of the following data are required:

a. Operating and maintenance instructions.
b. Spare part list.
c. Copies of approved submittal data.
d. Copies of panelboard circuit directories reflecting all field changes.
e. Test reports of all tests performed.
f. Certificates of inspection from AHJ.
g. Contact names and phone numbers for parts suppliers of submitted equipment.

PART 2 - PRODUCTS

2.01 STANDARDS FOR MATERIALS AND WORKMANSHIP

A. All material shall be new and shall bear the inspection label of Underwriter's Laboratories, Inc. (UL).

B. The published standards and requirements of the National Electrical Manufacturer's Association (NEMA), Underwriters' Laboratories (UL), Electrical Testing Laboratories (ETL), American National Standards Institute (ANSI), Institute of Electrical and Electronic Engineers (IEEE), Insulated Cable Engineers Association (ICEA), National Fire Protection Association (NFPA) and the American Society for Testing and Materials (ASTM) shall govern and apply where such have been established for the particular material in question.

C. Specified catalog numbers and trade or manufacturers names are intended to describe the material, devices, or apparatus desired for type, construction features, electrical characteristics, ratings, operating functions, style and quality. Similar materials of other manufacturers, not less than specified quality, capacity or character may be substituted in conformity with the provisions of the General and Supplementary Conditions. Materials of the same type shall be the product of one manufacturer. Refer to Shop Drawing requirements.

D. Furnish all materials specified herein or indicated on the drawings.

E. All work shall be installed in a practical and workmanlike manner by competent workmen, skilled in their trade.

F. Provide complete electrical characteristics for all equipment. Submit for approval data of the materials and equipment to be incorporated into the Work. Submittals shall include descriptive materials, catalog cuts, diagrams, performance characteristics, and charts published by the manufacturer indicating conformance to the specification and drawing requirements; model numbers alone will not be acceptable. Submittals shall be made by Specification section number. Submittals for lighting fixtures shall include full photometric data.

G. Shop drawings and/or catalog data submittals on all items of equipment and materials shall be submitted in conformity with requirements of the General and Supplementary Conditions. Do not submit more than the required number of sets. Do not submit equipment or materials not requested in the Specifications.

H. All material lists and shop drawing submittals shall include a stamped indication by the Contractor signifying that the submittals have been previously reviewed for complete compliance with the Contract Documents, that all coordination required between trades prior to field installation has occurred and that the material being submitted is approved for

installation. The stamped indication shall include the name of the contracting firm, the date of the review and the signature of the contractor. The Engineer will not review the shop drawing submittals without the contractor's stamped approval already on the shop drawings. The responsibility of complying with the Contract Documents will not be relieved by the Engineer's review, which requires 10 working days from the date the shop drawings are received by the Engineer.

I. All pricing is to be based upon the products, manufacturers, and processes described in the Contract Documents. Requests for approval of substitutions shall be written and delivered to the Architect's/Engineer's office in conformity with the provisions of the General and Supplemental Conditions. Do not submit any shop drawing or product data that does not conform with the contract documents.

J. Resubmittals, if necessary, shall be made as specified above. Resubmittals will highlight and indicate any and all revisions made thereto and will include the following text “Resubmittal #___", typed in a prominent location on the cover sheet.

K. The Contractor shall provide with the shop drawing submittal dimensioned layouts of all electrical rooms and spaces using the equipment he intends to furnish. Switchboard, panelboards, distribution panels, etc., will be rejected without dimensioned room layouts.

L. Submittals shall be noted with any deviations, alterations or limitations of product from the specified materials. The product will be rejected upon failure to indicate this information. Any conflict or failure to perform comparably to the originally specified materials will result in product rejection. It will be the Contractor's responsibility to replace the alternate material or equipment with the originally specified one and to demolish, replace, repair and retest the equipment, including repair or replacement of any component of the building, finishes or other systems affected by said replacement, at no additional costs to the Owner.

2.02 SLEEVES FOR RACEWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Sleeves for Rectangular Openings: Galvanized sheet steel.

1. Minimum Metal Thickness:

a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052 inch.
b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches (1270 mm) and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138 inch.

2.03 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.01 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

A. Comply with NECA 1.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

E. Right of Way: Give to piping systems installed at a required slope.

F. Before any piping, conduit, outlets, equipment or lighting fixtures are located in any area, coordinate the space requirements with all trades. Such shall be arranged so that space conditions will allow all trades to install their work and will also permit access for future maintenance and repair. Coordinate the installation of recessed electrical equipment with concealed ductwork, piping, insulation, structural appearances and wall thickness.

G. Piping, ductwork, conduit and equipment installed at variance with the above requirements shall be relocated and/or revised to conform with the above requirements without incurring additions to the Contract.

H. Coordination of space requirements with all trades shall be performed so that:

I. No piping or ductwork, other than electrical, shall be installed within dedicated space of panelboards, switchboards or transformers identified by NEC.

J. Do not scale drawings. Obtain dimensions for layout of equipment from the Architectural drawings unless noted on the Electrical drawings.

3.02 PROTECTION OF MATERIALS

A. Refer to the general requirements section of the Specifications for storage, protection and handling requirements.

B. Provide dry, weathertight staging and storage for materials and equipment requiring protection from weather and moisture per manufacturer's recommendations. Install temporary lighting or heat sources to prevent moisture accumulation. Provide protection against direct sunlight, precipitation, wind, ice, fire or excessive heat. Store materials in original undamaged packaging with manufacturer's labels and seals intact. Containers which are broken, damaged or watermarked are not acceptable and are subject to rejection.

C. Materials and equipment will not be installed until the environmental conditions of the project are suitable to protect same per manufacturer's recommendations. Equipment or materials damaged or subjected to moisture, precipitation, direct sunlight, cold or heat are not acceptable and shall be removed from the project and replaced at no additional costs to the Owner.

D. All conduit and other openings shall be kept protected to prevent entry of foreign matter or construction debris. Fixtures, equipment, and apparatus shall be kept covered for protection against dirt, water, chemical or mechanical damage before and during construction.

E. The original finish, including shop coat of paint of fixtures, apparatus or equipment that has been damaged shall be restored without incurring additions to the Contract in time or price.

3.03 CUTTING AND PATCHING

A. The Contractor is responsible for all cutting and patching, including escutcheon plates where necessary.

3.04 CLEANING AND PAINTING

A. Remove foreign materials, drywall compound, overspray, oil, dirt and grease from all raceway, fittings, supports, boxes, cabinets, pull boxes, panelboard trims and equipment to provide clean surfaces for painting. Remove surface oxidation and restore galvanized surfaces with cold process galvanizing compounds. Touchup marred or scratched surfaces of fixtures, panelboard and cabinet trims, motor control centers, switchboards, cabinets, and equipment enclosures with paint furnished by the equipment manufacturer specifically for that purpose.

B. Do not paint trim hinges, latches, clamps, locks, device covers or trim covers. Mask or remove such items prior to finishing.

C. Unless otherwise noted herein, all painting shall conform to the "Painting" section of the specifications.

D. Where plywood backboards are utilized to mount electrical or electronic equipment provided under Division 16, finish same with two (2) coats of light gray semi-gloss paint.

3.05 ACCESS TO ELECTRICAL ITEMS

A. Install all concealed electrical equipment, junction and pull boxes, apparatus, or devices so as to maintain access for maintenance, operations and replacement. Access doors or covers shall be provided where required by NEC or AHJ and shall be installed in accordance with manufacturer's instructions. Refer to the Architect for approved types, means, methods and appearance. Locate each access unit accurately in relation to electrical work requiring access.

3.06 ELECTRICAL ROOM AND CLOSETS

A. Manufacturer's equipment shall not be larger than that dimensioned, or scaled, on plans. Conflicts shall be brought to the attention of the Architect, for resolution prior to ordering equipment.

B. Clear working space in electric rooms and closets shall be no less than required by the N.E.C.

C. Submit for review, prior to construction or purchase of any equipment, scaled drawings of electrical rooms, closets, or spaces showing, in detail, planned installation locations of the equipment. These shall clearly show compliance with A and B above.

3.07 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with fire stop system used are fabricated during construction of floor or wall.

E. Cut sleeves to length for mounting flush with both surfaces of walls.

F. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable, unless indicated otherwise.

G. Seal space outside of sleeves with grout for penetrations of concrete and masonry

1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

H. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint.

I. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with fire stop materials.

J. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.

K. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

L. Underground, Exterior-Wall Penetrations: Install steel pipe sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

3.08 SLEEVE-SEAL INSTALLATION

A. Install to seal exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.09 EXCAVATION AND BACKFILLING

A. Provide and perform all excavation required to install conduit, ductbanks and manholes indicated on the drawings and/or specified. Trenches shall be of uniform width required with minimum 8" clearance on both sides. Remove and dispose of all materials not to be used for backfill. Maintain dry excavations for electrical work, by removing water. Grade areas to prevent surface water from entering excavation. Remove any accumulated water by pumping. Perform all excavation by open cut. Excavate with vertical-sided excavations where possible.

Where necessary, provide sheeting and cross-bracing to sustain sides of excavations. Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition. Establish requirements for trench shoring and bracing to comply with local codes and AHJ..

B. The bottom of all trenches and excavation shall be graded to provide uniform bearing surface for conduits or ductbanks on undisturbed soil at every point along entire length. Tamp over excavation with specified backfill materials. Remove unstable materials unsuitable for supporting equipment or installation and replace with specified materials for a minimum of twelve (12) inches below invert of equipment or installation.

C. Specified materials shall be utilized for backfilling, in not more than six (6) inch layers and tamped until the installation has cover of not less than the adjacent grade and not more than two (2) inches above same. Remove sheeting and cross-bracing during backfilling wherever such removal would not endanger the work or other property. Equalize backfilling operation to avoid shifting of materials and equipment installed. Compaction of backfill materials shall be at least equal to surrounding undisturbed material. Backfill trenches with concrete where excavations pass within 18" of footings or other utility lines. Do not settle backfill with water. Conform to compaction requirements and methods specified elsewhere.

3.10 TESTS AND CERTIFICATIONS

A. Upon completion of the electrical work and prior to final inspection, conduct an operating test in the presence of the Owner and the Architect/Engineer or his designated representative.

B. The installation shall be demonstrated to operate in accordance with the Contract Documents. Any material or workmanship which does not meet with the approval of the Architect/Engineer shall be removed, repaired or replaced as directed without incurring additions to the Contract in time or cost. All electrical systems shall be tested for compliance with the specifications.

C. Furnish all instructions, tools, test equipment and personnel required for the test. Have sufficient tools and personnel available to remove equipment covers, coverplates, etc., as required for review of internal wiring and proper inspection. Provide hand tools, flashlights, ladders, outlet testers, VOM, meters and keys required to access and observe system operation and characteristics. Turn circuits on and off as directed and demonstrate operation of equipment as directed.

D. Contractor shall test all wiring and connections for continuity and grounds by megger testing. Upon indication of defective insulation, Contractor shall remove and replace the defective conductor and demonstrate by testing that the new conductor is acceptable. Record feeder load currents and line voltages measured at each transformer, switchboard and panelboard after installation of all equipment and lighting. Adjust transformer taps as required to provide

optimum voltage levels. Adjust single phase load connections to balance feeder load and document on as-built drawings. Provide the Owner with full documentation of all testing for future reference.

E. Refer to the individual specification sections and the electrical systems testing section of the specifications for specific testing requirements.

F. The authorized manufacturer's service representative shall review systems and equipment for correct operation, conformance with specification requirements and manufacturer's requirements and submit certification indicating above mentioned conformances for the following systems:

1. Life Safety System.
2. Interfaces to Mechanical & Building Systems.

3.11 DEMONSTRATION AND INSTRUCTION

A. Present to the Owner and the Architect/Engineer or his designated representative a physical demonstration and oral instructions for proper operation and maintenance of each of the electrical equipment and systems installed. Authorized manufacturer's representatives familiar with the specified equipment shall conduct training for the following systems:

1. Life Safety System.
2. Interfaces to Mechanical & Building Systems.

3.12 WARRANTY

A. All systems and components shall be provided with a minimum one-year warranty from the time of final acceptance. The warranty shall cover all defects in materials, design and workmanship. During this warranty period, all defects in materials and workmanship shall be corrected without incurring additions to the Contract. The correction shall include removing the defective part(s), replacing and installing the new parts (including shipping and handling), all required cutting, patching, repainting, or other work involved, including repair or restoration of any damaged sections or parts of the premises resulting from any fault included in the warranty, entirely at the expense of the Contractor.

B. In addition to this general warranty, present to the Architect any other guarantees or warranties from equipment or system manufacturers. These supplemental guarantees or warranties shall not invalidate the general warranty.

3.13 FIRESTOPPING

A. Apply Firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly.

END OF SECTION

SECTION 26 0519

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:

1. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.

PART 2 - PRODUCTS

2.01 GENERAL

A. Conductors shall be copper: Comply with NEMA WC 70. All wire and cable and associated connectors shall be UL listed and shall bear the UL label.

B. All conductors shall have size, grade of insulation, voltage and manufacturer's name permanently marked on the exterior at maximum 24 inch intervals.

C. Control conductors for use on 120 volt control wiring shall be Type THHN/THWN, sized to avoid excessive voltage drop.

D. Prefabricated cable assemblies

1. Control conductors for use on 120 volt control wiring shall be Type THHN/THWN, sized to avoid excessive voltage drop.

E. Connectors

1. Terminations and connections shall be made with UL listed connectors applied per manufacturer's recommendations.
2. Connections shall be factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated drawings.
3. Connections of special system conductors shall be made via dedicated terminal strips labeled to indicate wire number and system type. Wire nut connections in system junction box are not acceptable.

2.02 CONDUCTORS AND CABLES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Alcan Products Corporation; Alcan Cable Division.
2. American Insulated Wire Corp.; a Leviton Company.
3. General Cable Corporation.
4. Southwire Company.
5. Rome Cable Corporation
6. Carol Cable
7. AFC Cable Systems Inc.
8. Cerro Wire, LLC
9. Triangle Wire & Cable, Inc.
10. The Okonite Company

B. Aluminum and Copper Conductors: Comply with NEMA WC 70.

C. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN and XHHW.

D. Multiconductor Cable: Comply with NEMA WC 70 for metal-clad cable, Type MC with ground wire.

2.03 SIGNAL CABLE PRODUCTS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Belden.
2. Dekoron.
3. Continental
4. West Penn.

2.04 CONNECTORS AND SPLICES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AFC Cable Systems, Inc.
2. Hubbell Power Systems, Inc.
3. O-Z/Gedney; EGS Electrical Group LLC.
4. 3M; Electrical Products Division.
5. AMP/Tyco Electronics Corp.

6. Burndy
7. Eagle Connector Corporation
8. Thomas & Betts Corporation

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.05 WIRE MANAGEMENT PRODUCTS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Panduit Corporation.
2. Wieland Inc.
3. AMP/Tyco Electronics Corp.
4. Thomas & Betts Corporation

2.06 WIRE PULLING LUBRICATION PRODUCTS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Ideal Industries Inc. – Yellow 77
2. Burndy - Silikon
3. Electro Compound Co. – Y ER EAS

PART 3 - EXECUTION

3.01 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.02 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type THHN-THWN, single conductors in raceway or type XHHW, single conductors in raceway.

B. Feeders: Type THHN-THWN, single conductors in raceway.

C. Branch Circuits Type THHN-THWN, single conductors in raceway.

D. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, and strain relief device at terminations to suit application.

E. Class 1 Control Circuits: Type THHN-THWN, in raceway.

F. Class 2 Control Circuits: Type THHN-THWN, in raceway.

3.03 INSTALLATION OF CONDUCTORS AND CABLES

A. All conductors shall be installed in conduit, unless noted otherwise. All conductors shall be pulled in at the same time. No conductors shall be pulled into the conduit until the conduit system is complete and plaster/drywall construction has dried. Clean, swab and evacuate conduit system before pulling in conductors. Do not exceed the manufacturer’s maximum pulling tension.

B. Conductors shall be continuous from outlet to outlet and from outlet to junction box or pull box. All splices and joints shall be carefully and securely made to be mechanically and electrically solid with proper U. L. Listed connectors. Where connection is made to any terminals of more than 30 amperes capacity and where conductors larger than No. 10 are connected to any terminal, copper terminal lugs shall be secured to the conductors. Where multiple connections are made to the same terminal, individual lugs for each conductor shall be used.

C. Each conduit shall have a minimum of three (3) conductors pulled in unless that particular conduit is noted as being for systems other than electrical circuitry and/or future use or unless noted otherwise. Grounding conductors are not shown in wire count but are required from circuit origin to last device.

D. Branch circuit conductors shall not be smaller than No. 12 and where the home run from panel to first device exceeds 60'-0", the conductors from home run outlet to panel shall be No. 10 minimum.

E. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

F. Branch circuit wiring which supplies more than one light fixture through wireway of other fixtures shall be rated for use at 105 degrees C.

G. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

H. Use pulling means; including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway.

I. Install exposed cables parallel and perpendicular to surfaces of exposed structural members and follow surface contours where possible.

J. Maintain phase rotation established at service entrance point throughout entire project.

K. Exposed conductors above ceiling shall be plenum-rated.

3.04 CONTROL WIRING

A. Control wiring is defined as the wiring that provides connections between control circuit elements and does not provide the power circuit.

B. Generally, control wiring is specified in other divisions; however, where a control device such as a push-button, thermostat, fire stat, etc. is to be installed in the power circuit, these devices shall be received, stored, and installed as part of the work of this Division.

C. Control wiring and conduit for control wiring shown on the electrical drawings shall be provided regardless of its function.

D. Exposed control wiring above ceiling shall be plenum-rated.

3.05 WIRE MANAGEMENT

A. Power and control wiring within all special system cabinets and enclosures, and within switchboards and electrical equipment shall be bundled or routed within slotted wiring duct in a workmanlike manner.

B. Any knockout, cutout or slot containing wiring shall be fitted with bushing or continuous grommet strip to avoid fraying or abrasion.

C. Train and lace all conductors within panelboard or control enclosures with cable ties or spiral wrapping.

D. Spare conductors installed shall be identified and capped.

3.06 CONNECTIONS

A. All connectors shall be UL listed and shall be utilized in full accordance with manufacturer’s requirements.

B. Termination lugs shall be applied to all single cables #8 and larger and shall be compression type fittings. The use of mechanical type lugs, kerneys, or other pressure type connections will not be permitted.

C. All compression connections shall be long barrel type installed using hydraulic tools designed for the purpose.

D. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

E. Insulated spring steel wire nut connectors shall be used for branch circuit connections of #10 and smaller conductors. Connections of #8 and larger sizes shall be made with compression type connections with insulated covers. Where exposed to moisture or corrosion spring steel wire nut connectors shall be silicone filled.

F. Control and special system riser and junction boxes shall be fitted with terminal strips and all conductors shall be labeled per system requirements. The installation of wire nuts in special system riser and junction boxes is not acceptable.

G. Splices shall be made only where specifically approved by the Engineer. Conductors shall be continuous from origin to first outlet box or manhole. Splices made exterior to the structure, or below grade, shall be compression type connections with insulated, waterproof covers. Submit splicing requests for review and approval prior to installation.

H. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.

I. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack.

END OF SECTION

SECTION 26 0533

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.02 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. ENT: Electrical nonmetallic tubing.

C. EPDM: Ethylene-propylene-diene terpolymer rubber.

D. FMC: Flexible metal conduit.

E. IMC: Intermediate metal conduit.

F. LFMC: Liquidtight flexible metal conduit.

G. LFNC: Liquidtight flexible nonmetallic conduit.

H. NBR: Acrylonitrile-butadiene rubber.

I. RNC: Rigid nonmetallic conduit.

1.03 SUBMITTALS

A. Product Data: floor boxes, hinged-cover enclosures, and cabinets.

1.04 QUALITY ASSURANCE

A. Comply with NFPA 70.

PART 2 - PRODUCTS

2.01 METAL CONDUIT AND TUBING

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AFC Cable Systems, Inc.
2. Alflex Inc.
3. Allied Tube & Conduit; a Tyco International Ltd. Co.
4. Anamet Electrical, Inc.; Anaconda Metal Hose.
5. Electri-Flex Co.
6. Manhattan/CDT/Cole-Flex.
7. Maverick Tube Corporation.
8. O-Z Gedney; a unit of General Signal.
9. Wheatland Tube Company.

B. Rigid Steel Conduit: ANSI C80.1.

C. IMC: ANSI C80.6.

1. Comply with NEMA RN 1.
2. Coating Thickness: 0.040 inch, minimum.

D. EMT: ANSI C80.3.

E. FMC: Zinc-coated steel.

F. LFMC: Flexible steel conduit with PVC jacket.

G. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.
1. Fittings for EMT: Steel, set-screw or compression type.

H. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable connector assemblies and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

2.02 NONMETALLIC CONDUIT AND TUBING

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AFC Cable Systems, Inc.
2. Anamet Electrical, Inc.; Anaconda Metal Hose.
3. Arnco Corporation.
4. CANTEX Inc.
5. CertainTeed Corp.; Pipe & Plastics Group.
6. Condux International, Inc.
7. ElecSYS, Inc.
8. Electri-Flex Co.
9. Lamson & Sessions; Carlon Electrical Products.
10. Manhattan/CDT/Cole-Flex.
11. RACO; a Hubbell Company.
12. Thomas & Betts Corporation.

B. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated.

C. Fittings for RNC: NEMA TC 3; match to conduit or tubing type and material.

2.03 SURFACE RACEWAYS

A. Surface Nonmetallic Raceways: One-piece construction, manufactured of rigid PVC with texture and color selected by Architect from manufacturer's standard colors.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Butler Manufacturing Company; Walker Division.
2. Enduro Systems, Inc.; Composite Products Division.
3. Hubbell Incorporated; Wiring Device-Kellems Division.
4. Lamson & Sessions; Carlon Electrical Products.
5. Panduit Corp.
6. Walker Systems, Inc.; Wiremold Company (The).
7. Wiremold Company (The); Electrical Sales Division.

2.04 OUTLET BOXES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. EGS/Appleton Electric.
3. Hoffman.
4. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.

5. O-Z/Gedney; a unit of General Signal.
6. RACO; a Hubbell Company.
7. Scott Fetzer Co.; Adalet Division.
8. Spring City Electrical Manufacturing Company.
9. Thomas & Betts Corporation.
10. Walker Systems, Inc.; Wiremold Company (The).

B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.

D. Nonmetallic Outlet and Device Boxes: NEMA OS 2.

E. Metal Floor Boxes: Cast or sheet metal, fully adjustable, rectangular.

F. Nonmetallic Floor Boxes: Nonadjustable, round.

G. Outlet boxes and covers shall be of such form and dimensions as to be adapted to their specified usage, locations, size and quantity of conduit, and size and quantity of conductors entering the boxes.

H. Outlet boxes for flush mounted light fixtures shall be four inch square boxes 1 ½” deep, with blank cover, installed adjacent to fixture served. Connection to fixture shall be with flexible steel conduit and fixture wire.

I. Flush ceiling outlets for surface or pendant mounted lighting fixtures shall be one-piece 4" square or octagonal pressed steel boxes, minimum two (2) inch depth.

J. Boxes for devices in unfinished masonry walls or stud walls shall be 4" square boxes with a square cornered tile wall cover (plaster ring), set flush with masonry or drywall construction. Where only one conduit enters box or one wiring device is provided, 2 3/4” deep box may be used. Outlet boxes for dimmers, GFI outlets, and all other conditions shall be full depth. Use multi-gang boxes where more than one device is mounted together under a common cover plate. Do not use sectional switch boxes.

K. Boxes in concrete ceiling slab shall be octagonal, concrete-tight, two (2) inch deep concrete boxes. Welded boxes are not acceptable.

L. All outlet boxes in plaster, drywall, stucco or masonry walls or ceiling shall be provided with plaster rings.

M. Junction boxes and all outlets not indicated as containing wiring devices or lighting fixtures shall have covers. Covers for outlets in walls shall be as specified for wall switches and receptacles.

N. Outlet boxes exposed to the weather, under raised floor, used in exterior wiring system and outlet boxes for vapor-tight lighting fixtures and devices shall be cast corrosion-resistant type.

O. In special "Fire Rated" partitions, outlets shall comply with ASTM No. E119 and maintain fire barrier ratings.

P. Utility (handy) boxes with matching covers may be used in mechanical and electrical spaces for switches and 15A/120V receptacles.

Q. Where special purpose devices are utilized and require larger outlet box than specified herein, provide outlet box suitable for specific device. These outlet boxes shall be of the same type as specified herein for the installation required. Coordinate requirements prior to rough-in installation.

2.05 JUNCTION AND PULL BOXES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. EGS/Appleton Electric.
3. Hoffman.
4. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
5. O-Z/Gedney; a unit of General Signal.
6. RACO; a Hubbell Company.
7. Scott Fetzer Co.; Adalet Division.
8. Spring City Electrical Manufacturing Company.
9. Thomas & Betts Corporation.
10. Walker Systems, Inc.; Wiremold Company (The).

B. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

C. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, cast aluminum with gasketed cover.

D. Dimensions of pull boxes and junction boxes shall not be less than those dimensions required by the National Electrical Code (NEC) for the number, size and position of conductors and raceway entering the box. Only a single extension ring shall be permitted on a box to increase the volume.

E. Pull boxes required in finished spaces shall be installed out of sight lines and located per Architect’s direction. Box shall be flush-mounted cabinets provided with trim, hinged door and flush latch and lock to match panel trim for flush mounted electrical panelboard.

F. Pull boxes for installation of vertical riser conductors shall be provided with suitable supports for all conductors as required by the NEC.

G. Pull boxes for horizontal feeders containing more than one feeder shall be compartmented by barriers (or feeder conductors shall be fire-taped) and provided with minimum 1 5/8" x 1 5/8" fiberglass channel strut (removable) for support of conductors. Wood supports within pull boxes are not acceptable.

H. Provide box covers for all junction and pull boxes of same materials and construction as box. Identify feeder or branch circuit conductors contained within on outside of cover for surface mounted boxes and within cover on flush mounted boxes.

2.06 CONDUIT BODIES AND FITTINGS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. EGS/Appleton Electric.
3. Hoffman.
4. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
5. O-Z/Gedney; a unit of General Signal.
6. RACO; a Hubbell Company.
7. Scott Fetzer Co.; Adalet Division.
8. Spring City Electrical Manufacturing Company.
9. Thomas & Betts Corporation.
10. Walker Systems, Inc.; Wiremold Company (The)

B. Conduit bodies and fittings shall be NEMA FB-1 zinc coated steel or malleable iron, taper threaded type, of material matching conduit type with gasketed cover containing captive screws.

2.07 WIRING TROUGH

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. EGS/Appleton Electric.
3. Hoffman.
4. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
5. O-Z/Gedney; a unit of General Signal.
6. RACO; a Hubbell Company.
7. Scott Fetzer Co.; Adalet Division.

8. Spring City Electrical Manufacturing Company.
9. Thomas & Betts Corporation.
10. Walker Systems, Inc.; Wiremold Company (The).

B. Wiring trough shall be NEMA 1, unless noted otherwise, hinged cover with captive screws, gray enamel finished inside and outside, 16 or 14 gauge steel as per NEC requirements. Size of trough based on NEC requirements.

2.08 PULL BOXES AND ENCLOSURES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. EGS/Appleton Electric.
3. Hoffman.
4. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
5. O-Z/Gedney; a unit of General Signal.
6. RACO; a Hubbell Company.
7. Scott Fetzer Co.; Adalet Division.
8. Spring City Electrical Manufacturing Company.
9. Thomas & Betts Corporation.
10. Walker Systems, Inc.; Wiremold Company (The)

B. Pull boxes for feeder and power conductors shall be NEMA 250, Type 1 with 14 or 12 gauge galvanized steel bodies and 12 or 10 gauge galvanized steel screw covers. Seams shall be continuously welded and ground smooth. Cover screws shall be captive, stainless steel type. Provide oil-resistant gasket and adhesive. Size pullboxes as specified.

C. Hinged door in front cover with flush latch and concealed hinge.

D. Key latch to match panelboards.

E. Metal barriers to separate wiring of different systems and voltage.

F. Accessory feet where required for freestanding equipment.

2.09 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

A. Exterior pull boxes shall be Quazite “PC” style gasketed boxes, resistant to sunlight exposure, weathering and chemicals, with solid base, penta-head security bolts, heavy duty rated cover with logo to suit purpose, with compressive strength of 11,000 psi, or approved equal. Size shall be

minimum 12" w x 18" d x 12"h unless noted otherwise. Set assembly at final finished grade elevation.

B. Exterior handholes shall be Quazite "PG" style stackable service box assemblies resistant to sunlight exposure, weathering and chemicals, with solid base, penta-head security bolts, heavy duty rated cover with logo to suit purpose, with compressive strength of 11,000 psi, or approved equal. Size shall be minimum 24" w x 36" d x 18"h unless noted otherwise. Provide extensions as required to bring assembly to final finished grade elevation.

C. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Quazite
2. Nelson
3. Killark
4. Associated Plastics
5. Armorcast Products Company.
6. Carson Industries LLC.
7. Christy Concrete Products.
8. Synertech Moulded Products, Inc.; a division of Oldcastle Precast.

PART 3 - EXECUTION

3.01 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:

1. Exposed Conduit: Rigid steel conduit.
2. Underground Conduit: RNC, Type EPC-40-PVC, direct buried.
3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
4. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
5. Application of Handholes and Boxes for Underground Wiring:

    a. Handholes and Pull Boxes Subject to Light-Duty Pedestrian Traffic Only: Fiberglass-reinforced polyester resin structurally tested according to SCTE 77 with 3000-lbf vertical loading.

B. Comply with the following indoor applications, unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT.
2. Concealed in Ceilings and Interior Walls and Partitions: EMT.

3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
4. Damp or Wet Locations: IMC.
5. Raceways for Optical Fiber or Communications Cable in Spaces Used for Environmental Air: Plenum-type, optical fiber/communications cable raceway.
6. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, nonmetallic in damp or wet locations.

C. Minimum Raceway Size: 3/4-inch trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer.

E. Do not install aluminum conduits in contact with concrete.

3.02 INSTALLATION

A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.

B. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation.

D. Arrange stub-ups so curved portions of bends are not visible above the finished slab.

E. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.

F. Raceways Embedded in Slabs:

1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.

G. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.

H. Raceways for Optical Fiber and Communications Cable: Install raceways, metallic and nonmetallic, rigid and flexible, as follows:

1. 3/4-Inch Trade Size and Smaller: Install raceways in maximum lengths of 50 feet.
2. 1-Inch Trade Size and Larger: Install raceways in maximum lengths of 75 feet.
3. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.

I. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where otherwise required by NFPA 70.

3.03 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.

B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.

D. Install handholes and boxes with bottom below the frost line.

3.04 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION

SECTION 26 0553

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Identification for raceways.
2. Identification of power and control cables.
3. Identification for conductors.
4. Underground-line warning tape.
5. Warning labels and signs.
6. Instruction signs.
7. Equipment identification labels.
8. Miscellaneous identification products.

1.02 QUALITY ASSURANCE

A. Comply with ANSI A13.1.

B. Comply with NFPA 70.

C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.

D. Comply with ANSI Z535.4 for safety signs and labels.

E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

1.03 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.

B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

C. Coordinate installation of identifying devices with location of access panels and doors.

D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.01 FLOOR MARKING TAPE

A. 2-inch- wide, 5-mil pressure-sensitive vinyl tape, with black and white stripes and clear vinyl overlay.

2.02 UNDERGROUND-LINE WARNING TAPE

A. Tape:

1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
2. Printing on tape shall be permanent and shall not be damaged by burial operations.
3. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.

B. Color and Printing:

1. Comply with ANSI Z535.1 through ANSI Z535.5.
2. Inscriptions for Red-Colored Tapes: ELECTRIC LINE, HIGH VOLTAGE.
3. Inscriptions for Orange-Colored Tapes: TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE.

2.03 WARNING LABELS AND SIGNS

A. Comply with NFPA 70 and 29 CFR 1910.145.

B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

2.04 INSTRUCTION SIGNS

A. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch.

2.05 EQUIPMENT IDENTIFICATION LABELS

A. Indoor Equipment - Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch.

B. Outdoor Equipment - Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch.

2.06 CABLE TIES

A. General-Purpose Cable Ties: Fungus inert, self extinguishing, one piece, self locking, Type 6/6 nylon.

1. Minimum Width: 3/16 inch
2. Tensile Strength at 73 deg F According to ASTM D 638: 12,000 psi.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black except where used for color-coding.

B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self extinguishing, one piece, self locking, Type 6/6 nylon.

1. Minimum Width: 3/16 inch
2. Tensile Strength at 73 deg F According to ASTM D 638: 12,000 psi.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: Black.

C. Plenum-Rated Cable Ties: Self extinguishing, UV stabilized, one piece, self locking.

1. Minimum Width: 3/16 inch.
2. Tensile Strength at 73 deg F, According to ASTM D 638: 7000 psi.
3. UL 94 Flame Rating: 94V-0.
4. Temperature Range: Minus 50 to plus 284 deg F.
5. Color: Black.

2.07 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Paint: Comply with requirements in Division 09 painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).

B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Apply identification devices to surfaces that require finish after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

E. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

F. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:

1. Outdoors: UV-stabilized nylon.
2. In Spaces Handling Environmental Air: Plenum rated.

G. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.

H. Painted Identification: Comply with requirements in Division 09 painting Sections for surface preparation and paint application.

3.02 IDENTIFICATION SCHEDULE

A. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.

1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for service, feeder, and branch-circuit conductors.

a. Color shall be factory applied.
b. Colors for 208/120-V Circuits:

1) Phase A: Black.
2) Phase B: Red.
3) Phase C: Blue.
4) Neutral White
5) Ground Green
6) IG Neutral White with Green Stripe
7) IG Ground Green with White Stripe

B. Install instructional sign including the color-code for grounded conductors using adhesive-film-type labels.

C. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.

D. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.

1. Limit use of underground-line warning tape to direct-buried cables.
2. Install underground-line warning tape for both direct-buried cables and cables in raceway.

E. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.

F. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive warning labels.

1. Comply with 29 CFR 1910.145.
2. Identify system voltage with black letters on an orange background.
3. Apply to exterior of door, cover, or other access.
4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:

    a. Power transfer switches.
    b. Controls with external control power connections.

G. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.

H. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Equipment to Be Labeled:

    a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be engraved, laminated acrylic or melamine label.
    b. Enclosures and electrical cabinets.
    c. Access doors and panels for concealed electrical items.
    d. Switchboards.
    e. Enclosed switches.
    f. Enclosed circuit breakers.
    g. Variable-speed controllers.
    h. Push-button stations.
    i. Contactors.
    j. Remote-controlled switches, dimmer modules, and control devices.
    k. Battery-inverter units.

END OF SECTION

SECTION 26 0573.13

SHORT-CIRCUIT STUDIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes a computer-based, fault-current study to determine the minimum interrupting capacity of circuit protective devices.

1.03 DEFINITIONS

A. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed and salvaged, or removed and reinstalled. Existing to remain items shall remain functional throughout the construction period.

B. Field Adjusting Agency: An independent electrical testing agency with full-time employees and the capability to adjust devices and conduct testing indicated and that is a member company of NETA.

C. One-Line Diagram: A diagram that shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.

D. Power System Analysis Software Developer: An entity that commercially develops, maintains, and distributes computer software used for power system studies.

E. Power Systems Analysis Specialist: Professional engineer in charge of performing the study and documenting recommendations, licensed in the state where Project is located.

F. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion of the circuit from the system.

G. SCCR: Short-circuit current rating.

H. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

I. Single-Line Diagram: See "One-Line Diagram."

1.04 ACTION SUBMITTALS

A. Product Data:

1. For computer software program to be used for studies.

2. Submit the following after the approval of system protective devices submittals. Submittals shall be in digital form.
    a. Short-circuit study input data, including completed computer program input data sheets.
    b. Short-circuit study and equipment evaluation report; signed, dated, and sealed by a qualified professional engineer.
        1) Submit study report for action prior to receiving final approval of distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Architect for preliminary submittal of sufficient study data to ensure that selection of devices and associated characteristics is satisfactory.
        2) Revised one-line diagram, reflecting field investigation results and results of short-circuit study.

1.05 INFORMATIONAL SUBMITTALS

A. Qualification Data:
    1. For Power Systems Analysis Software Developer.
    2. For Power System Analysis Specialist.
    3. For Field Adjusting Agency.

B. Product Certificates: For short-circuit study software, certifying compliance with IEEE 399.

1.06 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data:
    1. For overcurrent protective devices to include in emergency, operation, and maintenance manuals.
    2. The following are from the Short-Circuit Study Report:
        a. Final one-line diagram.
        b. Final Short-Circuit Study Report.
        c. Short-circuit study data files.
        d. Power system data.

1.07 QUALITY ASSURANCE

A. Study shall be performed using commercially developed and distributed software designed specifically for power system analysis.

B. Software algorithms shall comply with requirements of standards and guides specified in this Section.

C. Manual calculations are unacceptable.

1. Power System Analysis Software Qualifications: Computer program shall be designed to perform short-circuit studies or have a function, component, or add-on module designed to perform short-circuit studies.

2. Computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.

D. Power Systems Analysis Specialist Qualifications: Professional engineer licensed in the state where Project is located. All elements of the study shall be performed under the direct supervision and control of this professional engineer.

E. Short-Circuit Study Certification: Short-Circuit Study Report shall be signed and sealed by Power Systems Analysis Specialist.

F. Field Adjusting Agency Qualifications:

1. Employer of a NETA ETT-Certified Technician Level III or NICET Electrical Power Testing Level III certification responsible for all field adjusting of the Work.

2. A member company of NETA.

3. Acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.01 POWER SYSTEM ANALYSIS SOFTWARE DEVELOPERS

A. Comply with IEEE 399 and IEEE 551.

1. Analytical features of power systems analysis software program shall have capability to calculate "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.

B. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output.

2.02 SHORT-CIRCUIT STUDY REPORT CONTENTS

A. Executive summary of study findings.

B. Study descriptions, purpose, basis, and scope. Include case descriptions, definition of terms, and guide for interpretation of results.

C. One-line diagram of modeled power system, showing the following:

1. Protective device designations and ampere ratings.

2. Conductor types, sizes, and lengths.

3. Transformer kilovolt ampere (kVA) and voltage ratings.

4. Motor and generator designations and kVA ratings.

5. Switchgear, switchboard, motor-control center, and panelboard designations and ratings.
6. Derating factors and environmental conditions.
7. Any revisions to electrical equipment required by the study.

D. Comments and recommendations for system improvements or revisions in a written document, separate from one-line diagram.

E. Protective Device Evaluation:

1. Evaluate equipment and protective devices and compare to available short-circuit currents. Verify that equipment withstand ratings exceed available short-circuit current at equipment installation locations.
2. Tabulations of circuit breaker, fuse, and other protective device ratings versus calculated short-circuit duties.
3. For 600-V overcurrent protective devices, ensure that interrupting ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.
4. For devices and equipment rated for asymmetrical fault current, apply multiplication factors listed in standards to 1/2-cycle symmetrical fault current.
5. Verify adequacy of phase conductors at maximum three-phase bolted fault currents; verify adequacy of equipment grounding conductors and grounding electrode conductors at maximum ground-fault currents. Ensure that short-circuit withstand ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.

F. Short-Circuit Study Input Data:

1. One-line diagram of system being studied.
2. Power sources available.
3. Manufacturer, model, and interrupting rating of protective devices.
4. Conductors.
5. Transformer data.

G. Short-Circuit Study Output Reports:

1. Low-Voltage Fault Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:
    a. Voltage.
    b. Calculated fault-current magnitude and angle.
    c. Fault-point X/R ratio.
    d. Equivalent impedance.
2. Momentary Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:
    a. Voltage.
    b. Calculated symmetrical fault-current magnitude and angle.

c. Fault-point X/R ratio.

d. Calculated asymmetrical fault currents:

1) Based on fault-point X/R ratio.

2) Based on calculated symmetrical value multiplied by 1.6.

3) Based on calculated symmetrical value multiplied by 2.7.

3. Interrupting Duty Report: Three-phase and unbalanced fault calculations, showing the following for each overcurrent device location:

a. Voltage.

b. Calculated symmetrical fault-current magnitude and angle.

c. Fault-point X/R ratio.

d. No AC Decrement (NACD) ratio.

e. Equivalent impedance.

f. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a symmetrical basis.

g. Multiplying factors for 2-, 3-, 5-, and 8-cycle circuit breakers rated on a total basis.

PART 3 - EXECUTION

3.01 POWER SYSTEM DATA

A. Obtain all data necessary for conduct of the study.

1. Verify completeness of data supplied on one-line diagram. Call any discrepancies to Architect's attention.

2. For equipment included as Work of this Project, use characteristics submitted under provisions of action submittals and information submittals for this Project.

3. For equipment that is existing to remain, obtain required electrical distribution system data by field investigation and surveys, conducted by qualified technicians and engineers. Qualifications of technicians and engineers shall be as defined by NFPA 70E.

B. Gather and tabulate the required input data to support the short-circuit study. Comply with requirements in Section 017839 "Project Record Documents" for recording circuit protective device characteristics. Record data on a Record Document copy of one-line diagram. Comply with recommendations in IEEE 551 as to the amount of detail that is required to be acquired in the field. Field data gathering shall be under direct supervision and control of the engineer in charge of performing the study, and shall be by the engineer or its representative who holds NETA ETT-Certified Technician Level III or NICET Electrical Power Testing Level III certification. Data include, but are not limited to, the following:

1. Product Data for Project's overcurrent protective devices involved in overcurrent protective device coordination studies. Use equipment designation tags that are

consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.

2. Obtain electrical power utility impedance at the service.
3. Power sources and ties.
4. For transformers, include kVA, primary and secondary voltages, connection type, impedance, X/R ratio, taps measured in percent, and phase shift.
5. For reactors, provide manufacturer and model designation, voltage rating, and impedance.
6. For circuit breakers and fuses, provide manufacturer and model designation. List type of breaker, type of trip, SCCR, current rating, and breaker settings.
7. Generator short-circuit current contribution data, including short-circuit reactance, rated kVA, rated voltage, and X/R ratio.
8. Busway manufacturer and model designation, current rating, impedance, lengths, and conductor material.
9. Motor horsepower and NEMA MG 1 code letter designation.
10. Conductor sizes, lengths, number, conductor material and conduit material (magnetic or nonmagnetic).
11. Derating factors.

3.02 SHORT-CIRCUIT STUDY

A. Perform study following the general study procedures contained in IEEE 399.

B. Calculate short-circuit currents according to IEEE 551.

C. Base study on device characteristics supplied by device manufacturer.

D. Begin short-circuit current analysis at the service, extending down to system overcurrent protective devices as follows:

1. To normal system low-voltage load buses where fault current is 10 kA or less.

E. Study electrical distribution system from normal and alternate power sources throughout electrical distribution system for Project. Study all cases of system-switching configurations and alternate operations that could result in maximum fault conditions.

F. Include the ac fault-current decay from induction motors, synchronous motors, and asynchronous generators and apply to low- and medium-voltage, three-phase ac systems. Also account for the fault-current dc decrement to address asymmetrical requirements of interrupting equipment.

G. Calculate short-circuit momentary and interrupting duties for a three-phase bolted fault and a single line-to-ground fault at each equipment indicated on one-line diagram.

1. For grounded systems, provide a bolted line-to-ground fault-current study for areas as defined for the three-phase bolted fault short-circuit study.

H. Include in the report identification of any protective device applied outside its capacity.

END OF SECTION

SECTION 26 0923

LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following lighting control devices:

1. Indoor occupancy sensors.
2. Daylight sensor.

1.02 DEFINITIONS

A. LED: Light-emitting diode.

B. PIR: Passive infrared.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated.

1.04 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.05 COORDINATION

A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.01 OUTDOOR PHOTOELECTRIC SWITCHES

A. Provide the product indicated in the drawings.

B. Description: UL listed, solid state, normally open, isolated relay contacts rated for 1 amp @ 30VAC/VDC, to operate connected relay, contactor coils, or microprocessor input.

1. Light-Level Monitoring Range: 1 to 15 fc with an adjustment for turn-on and turn-off levels within that range.
2. Time Delay: 8-second minimum, to prevent false operation.
3. Mounting: ½" threaded-stem mounting or stem-and-swivel mounting accessories as required to direct sensor to the north sky exposure.

2.02 INDOOR OCCUPANCY SENSORS

A. Provide the product indicated on the drawings.

B. Wall- or ceiling-mounting, solid-state units with a separate relay unit.

1. Operation: Unless otherwise indicated, turn lights on when covered area is occupied and off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
2. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A. Sensor shall be powered from the relay unit.
3. Relay Unit (Power Pack): Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Power supply to sensor shall be 24-V dc, 150-mA, Class 2 power source as defined by NFPA 70.
4. Mounting:

    a. Sensor: Suitable for mounting in any position on a standard outlet box.
    b. Relay: Externally mounted through a 1/2-inch (13-mm) knockout in a standard electrical enclosure.
    c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.

5. Indicator: LED, to show when motion is being detected during testing and normal operation of the sensor.
6. Bypass Switch: Override the on function in case of sensor failure.
7. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc (21.5 to 2152 lx); keep lighting off when selected lighting level is present.

C. Dual-Technology Type: Ceiling mounting; detect occupancy by using a combination of PIR and ultrasonic detection methods in area of coverage. Particular technology or combination of technologies that controls on-off functions shall be selectable in the field by operating controls on unit.

1. Sensitivity Adjustment: Separate for each sensing technology.
2. Detector Sensitivity: Detect occurrences of 6-inch- (150-mm-) minimum movement of any portion of a human body that presents a target of not less than 36 sq. in. (232 sq. cm) and detect a person of average size and weight moving not less than 12 inches (305 mm) in either a horizontal or a vertical manner at an approximate speed of 12 inches/s (305 mm/s).
3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. (93 sq. m) when mounted on a 96-inch- (2440-mm-) high ceiling.

2.03 DAYLIGHT SENSOR

A. Refer to Sensor Schedule on drawings for specification.

PART 3 - EXECUTION

3.01 SENSOR INSTALLATION

A. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

3.02 CONTACTOR INSTALLATION

A. Mount electrically held lighting contactors with elastomeric isolator pads, to eliminate structure-borne vibration, unless contactors are installed in an enclosure with factory-installed vibration isolators.

3.03 WIRING INSTALLATION

A. Wiring Method: Minimum conduit size shall be 1/2 inch.

B. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and non-power-limited conductors according to conductor manufacturer's written instructions.

C. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.

D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.04 IDENTIFICATION

A. Identify components and power and control wiring.

1. Identify controlled circuits in lighting contactors.
2. Identify circuits or luminaries controlled by photoelectric and occupancy sensors at each sensor.

B. Label time switches and contactors with a unique designation.

3.05 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:

1. After installing time switches and sensors, and after electrical circuitry has been energized, adjust and test for compliance with requirements.
2. Operational Test: Verify operation of each lighting control device and adjust time delays.

B. Lighting control devices that fail tests and inspections are defective work.

3.06 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting sensors to suit occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

END OF SECTION

SECTION 26 2416

PANELBOARDS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Distribution panelboards.
2. Lighting and appliance branch-circuit panelboards.

1.02 DEFINITIONS

A. SVR: Suppressed voltage rating.

B. TVSS: Transient voltage surge suppressor.

1.03 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Panelboards shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

1.04 SUBMITTALS

A. Product Data: For each type of panelboard, switching and overcurrent protective device, transient voltage suppression device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panelboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
2. Detail enclosure types and details for types other than NEMA 250, Type 1.
3. Detail bus configuration, current, and voltage ratings.

4. Short-circuit current rating of panelboards and overcurrent protective devices.
5. Include evidence of NRTL listing for series rating of installed devices.
6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
7. Include wiring diagrams for power, signal, and control wiring.

C. Field Quality-Control Reports:

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

D. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
2. Time-current curves, including selectable ranges for each type of overcurrent protective device that allows adjustments.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Handle and prepare panelboards for installation according to NECA 407.

1.06 PROJECT CONDITIONS

A. Environmental Limitations:

1.07 COORDINATION

A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

1.08 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Keys: Two spares for each type of panelboard cabinet lock.
2. Circuit Breakers Including GFCI and Ground Fault Equipment Protection (GFEP) Types: Two spares for each panelboard.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS FOR PANELBOARDS

A. Enclosures: Surface-mounted cabinets.

1. Rated for environmental conditions at installed location.

a. Indoor Dry and Clean Locations: NEMA 250, Type 1.

2. Width: Single-row / Column Width Style as available per panelboard application.

3. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
4. Skirt for Surface-Mounted Panelboards: Same gage and finish as panelboard front with flanges for attachment to panelboard, wall, and ceiling or floor.
5. Gutter Extension and Barrier: Same gage and finish as panelboard enclosure; integral with enclosure body. Arrange to isolate individual panel sections.
6. Finishes:

a. Panels and Trim: Steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
b. Back Boxes: Same finish as panels and trim.

7. Directory Card: Inside panelboard door, mounted in transparent card holder.

B. Incoming Mains Location: Top and bottom.

C. Phase, Neutral, and Ground Buses:

1. Material: Tin-plated aluminum.
2. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
3. Isolated Ground Bus: Adequate for branch-circuit isolated ground conductors; insulated from box.

D. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Material: Hard-drawn copper, 98 percent conductivity.

2. Main and Neutral Lugs: Mechanical type.
3. Ground Lugs and Bus-Configured Terminators: Mechanical type.

E. Service Equipment Label: NRTL labeled for use as service equipment for panelboards or load centers with one or more main service disconnecting and overcurrent protective devices.

F. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

G. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.

2.02 DISTRIBUTION PANELBOARDS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Eaton Electrical Inc.; Cutler-Hammer Business Unit. Pow-R-line Type PRL3a, 800A enclosure (28” wide x 5.75” deep).
2. General Electric Company: GE Consumer & Industrial – Electrical Distribution
3. Siemens Energy & Automation, Inc. Type P2 (20” wide x 5.75” deep)
4. Square D; a brand of Schneider Electric. I-Line Type HCN (26” wide x 6.5” deep).

B. Panelboards: NEMA PB 1, power and feeder distribution type.

C. Doors: Secured with vault-type latch with tumbler lock; keyed alike.

1. For doors more than 36 inches high, provide two latches, keyed alike.

D. Mains: Circuit breaker

E. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers; plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.

2.03 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit
2. General Electric Company
3. Siemens Energy & Automation, Inc.
4. Square D; a brand of Schneider Electric

B. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.

C. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

D. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

E. Column-Type Panelboards: Narrow gutter extension, with cover, to overhead junction box equipped with ground and neutral terminal buses.

2.04 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit
2. General Electric Company
3. Siemens Energy & Automation, Inc.
4. Square D; a brand of Schneider Electric

B. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with interrupting capacity to meet available fault currents.

1. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.

a. Instantaneous trip.

2. Molded-Case Circuit-Breaker (MCCB) Features and Accessories:

a. Standard frame sizes, trip ratings, and number of poles.
b. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
c. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.
d. Multipole units enclosed in a single housing or factory assembled to operate as a single unit.
e. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in on or off position.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Receive, inspect, handle, and store panelboards according to NECA 407.

B. Examine panelboards before installation. Reject panelboards that are damaged or rusted or have been subjected to water saturation.

C. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install panelboards and accessories according to NECA 407.

B. Mount top of trim 90 inches above finished floor unless otherwise indicated.

C. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.

D. Install overcurrent protective devices and controllers not already factory installed.

E. Install filler plates in unused spaces.

F. Comply with NECA 1.

3.03 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components.

B. Panelboard Nameplates: Label each panelboard with a nameplate.

3.04 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Acceptance Testing Preparation:

1. Test insulation resistance for each panelboard bus, component, connecting supply,and feeders..
2. Test continuity of each circuit.

C. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
3. Perform the following infrared scan tests and inspections and prepare reports:

a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each panelboard. Remove front panels so joints and connections are accessible to portable scanner.
b. Instruments and Equipment:

1) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

D. Panelboards will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken and observations after remedial action.

3.05 ADJUSTING

A. Adjust moving parts and operable component to function smoothly and lubricate as recommended by manufacturer.

3.06 PROTECTION

A. Temporary Heating: Apply temporary heat to maintain temperature according to manufacturer's written instructions.

END OF SECTION

SECTION 26 2726

WIRING DEVICES

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:

1. Receptacles, receptacles with integral GFCI, and associated device plates.
2. Isolated-ground receptacles.
3. Snap switches.
4. Communications outlets.
5. Floor service outlets and multi-outlet assemblies.
6. Chime with Pushbutton.
7. Multi-outlet Assemblies.

1.02 DEFINITIONS

A. EMI: Electromagnetic interference.

B. GFCI: Ground-fault circuit interrupter.

C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

D. RFI: Radio-frequency interference.

E. TVSS: Transient voltage surge suppressor.

F. UTP: Unshielded twisted pair.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated.

1.04 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single manufacturer and one source.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.01 STRAIGHT BLADE RECEPTACLES

A. Duplex Convenience Receptacles, 125 V, 20 A: Duplex receptacles shall be heavy-duty specification grade, plastic base, nylon face, two-pole, three wire, self-grounding, back/side wired, 125 volts AC and NEMA 5-20R (20A) rating. Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.

B. Simplex Convenience Receptacles, 125 V, 20 A: Simplex receptacles shall be heavy-duty specification grade, plastic base, nylon face, two-pole, three wire, self-grounding, back/side wired, 125 volts AC and NEMA 5-20R (20A) rating. Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.

C. Special Receptacles: Special purpose outlets shall be heavy-duty specification grade, plastic base, nylon face, poles as noted, wires as noted, grounding type, back/side wired, with voltage and capacity rating noted. Conform to NEMA configuration requirements.

D. Isolated-Ground, Duplex Convenience Receptacles, 125 V, 20 A: Isolated ground duplex receptacles shall be orange heavy-duty specification grade, plastic base, nylon face, two-pole, three wire, self-grounding, back/side wired, 125 volts AC and NEMA 5-20R (20A) rating. Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.

1. Description: Straight blade; equipment grounding contacts shall be connected only to the green grounding screw terminal of the device and with inherent electrical isolation from mounting strap. Isolation shall be integral to receptacle construction and not dependent on removable parts.

2.02 GFCI RECEPTACLES

A. General Description: Straight blade, non-feed-through type. Ground fault circuit interrupting (GFCI) duplex receptacles shall be heavy-duty, industrial specification grade, plastic base, nylon face, two-pole, three wire, supplied with pre-stripped wire leads, feed-through protection, 125 volts AC and NEMA 5-20R (20A) rating. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped.

B. Weatherproof Duplex Receptacles: Exterior flush mounted duplex outlets shall be GFCI heavy-duty, industrial specification grade, plastic base, nylon face, two-pole, three wire, supplied with pre-stripped wire leads, feed-through protection, 125 volts AC and NEMA 5-20R (20A) recessed mounted in TayMac model Masque 72206 or approved equal gasketed enclosure. Unit assembly shall protrude no more than 1/2” and shall be rainproof in use per NEC 410-57. Provide color as specified by the Architect.

2.03 CORD AND PLUG SETS

A. Description: Match voltage and current ratings and number of conductors to requirements of equipment being connected.

1. Cord: Rubber-insulated, stranded-copper conductors, with Type SOW-A jacket; with green-insulated grounding conductor and equipment-rating ampacity plus a minimum of 30 percent.
2. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Arrow Hart.
2. Eagle.
3. Hubbell.
4. Leviton.
5. Pass & Seymour.

2.04 SNAP SWITCHES

A. Comply with NEMA WD 1 and UL 20.

B. General Description: Wall switches shall be Institutional, heavy-duty specification grade, plastic body, nylon or lexan toggle, totally enclosed base & cover, quiet type, self-grounding, back wired, 277/120 volts AC and 20A rating:

C. Flush motor switches shall have a red pilot light and overload protection for actual fractional horsepower motors furnished.

2.05 COMMUNICATIONS OUTLETS

A. Telephone and Data Outlet:

1. Description: Single RJ-45 jack for terminating 100-ohm, balanced, four-pair UTP; TIA/EIA-568-B.1; complying with Category 5e. Comply with UL 1863.

B. Combination TV and Telephone Outlet:

1. Description: Single RJ-45 jack for 100-ohm, balanced, four-pair UTP; TIA/EIA-568-B.1; complying with Category 5e; and one Type F coaxial cable connector.

2.06 WALL PLATES

A. Single and combination types to match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Material: Smooth, high-impact thermoplastic.
3. Material for Masonry Wall: Jumbo type, smooth, high-impact thermoplastic.
4. Cover plates for flush mounted GFCI devices shall be premarked “GFCI PROTECTED.”
5. Cover plates for flush mounted IG devices shall be pre-marked “ISOLATED GROUND".
6. Telephone/data outlet cover plates shall be the same finish as above and have two (2) modular jack openings with blank fillers as required.

2.07 TELLER SWITCH WITH PILOT LIGHT

A. Commercial Grade Pilot AC combination switch toggle.

B. Color: White.

C. 15Amp

D. 120 Volt.

E. Neon Pilot.

F. Steel warp material.

2.08 FLOOR SERVICE FITTINGS

A. Type: Modular, flush-type, dual-service units suitable for wiring method used.

B. Compartments: Barrier separates power from voice and data communication cabling.

C. Service Plate: Rectangular, solid brass with satin finish.

D. Power Receptacle: Coordinate with power plan for configuration.

E. Voice and Data Communication Outlet: Coordinate with power plan for configuration.

F. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Hubbell Incorporated; Wiring Device-Kellems.
2. Steel City
3. Walker.

2.09 CHIME WITH PUSHBUTTON

A. General

1. Pushbutton shall be 13/16” round, unlighted and white in color. Mount pushbutton 48” above finished floor
2. Chime shall be recessed, electronic with flush mounted white louvered grille. Faceplate shall be able to be field painted. Provide 2-3/4” deep back box. Cover shall be 6-11/16” wide by 8-5/8” high. Cutout shall be 5-1/4” wide by 7-1/4” high.
3. Provide low voltage wired transformer compatible with chime. Transformer shall be located in recessed junction box adjacent to chime.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Pushbutton: NUTONE #PB18WHCL
2. Chime: NUTONE #LA174WH
3. Transformer: NUTONE #C915 16 VOLT 10VA
4. Doorbell Push Button cover plate: 2159W-BOX WALPLAT 1GNG.

2.10 MULTI OUTLET ASSEMBLIES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Hubbell Incorporated; Wiring Device-Kellems.
2. Wiremold Company (The).

B. Components of Assemblies: Products from a single manufacturer designed for use as a complete, matching assembly of raceways and receptacles.

C. Raceway Material: PVC.

D. Wire: No. 12 AWG.

2.11 FINISHES

A. Color: Wiring device catalog numbers in Section Text do not designate device color.

1. Wiring Devices Connected to Normal Power System: White, unless otherwise indicated or required by NFPA 70 or device listing.
2. Isolated-Ground Receptacles: Orange.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.

B. Coordination with Other Trades:

1. Take steps to insure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.
2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is toweled flush with the face of the wall.
4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.

3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
4. Existing Conductors:

    a. Cut back and pigtail or replace all damaged conductors.
    b. Straighten conductors that remain and remove corrosion and foreign matter.
    c. Pigtailing existing conductors is permitted provided the outlet box is large enough.

D. Device Installation:

1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by the manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the right.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

H. Adjust locations of floor service outlets to suit arrangement of partitions and furnishings.

3.02 IDENTIFICATION

A. Comply with Division 26 Section "Identification for Electrical Systems."

1. Receptacles: Identify panelboard and circuit number from which served. Use hot, stamped or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3.03 FIELD QUALITY CONTROL

A. Tests for Convenience Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.
2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is not acceptable.
3. Ground Impedance: Values of up to 2 ohms are acceptable.
4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
5. Using the test plug, verify that the device and its outlet box are securely mounted.
6. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

END OF SECTION

SECTION 26 2813

FUSES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Cartridge fuses rated 600 V ac and less for use in the following:
    a. Control circuits.
    b. Enclosed controllers.
    c. Enclosed switches.
2. Spare-fuse cabinets.

1.03 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for spare-fuse cabinets. Include the following for each fuse type indicated:

1. Ambient Temperature Adjustment Information: If ratings of fuses have been adjusted to accommodate ambient temperatures, provide list of fuses with adjusted ratings.
    a. For each fuse having adjusted ratings, include location of fuse, original fuse rating, local ambient temperature, and adjusted fuse rating.
    b. Provide manufacturer's technical data on which ambient temperature adjustment calculations are based.
2. Dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings.
3. Current-limitation curves for fuses with current-limiting characteristics.
4. Coordination charts and tables and related data.
5. Fuse sizes for elevator feeders and elevator disconnect switches.

1.04 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fuses to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

1. Ambient temperature adjustment information.
2. Current-limitation curves for fuses with current-limiting characteristics.
3. Coordination charts and tables and related data.

1.05 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.

1.06 FIELD CONDITIONS

A. Where ambient temperature to which fuses are directly exposed is less than 40 deg F (5 deg C) or more than 100 deg F (38 deg C), apply manufacturer's ambient temperature adjustment factors to fuse ratings.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Source Limitations: Obtain fuses, for use within a specific product or circuit, from single source from single manufacturer.

2.02 CARTRIDGE FUSES

A. Characteristics: NEMA FU 1, current-limiting, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.

1. Type RK-1: 250-V, zero- to 600-A rating, 200 kAIC, time delay.
2. Type RK-5: 250-V, zero- to 600-A rating, 200 kAIC, time delay.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Comply with NEMA FU 1 for cartridge fuses.

D. Comply with NFPA 70.

E. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels.

2.03 SPARE-FUSE CABINET

A. Characteristics: Wall-mounted steel unit with full-length, recessed piano-hinged door and key-coded cam lock and pull.

1. Size: Adequate for storage of spare fuses specified with 15 percent spare capacity minimum.
2. Finish: Gray, baked enamel.
3. Identification: "SPARE FUSES" in 1-1/2-inch- (38-mm-) high letters on exterior of door.
4. Fuse Pullers: For each size of fuse, where applicable and available, from fuse manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine fuses before installation. Reject fuses that are moisture damaged or physically damaged.

B. Examine holders to receive fuses for compliance with installation tolerances and other conditions affecting performance, such as rejection features.

C. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.

D. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 FUSE APPLICATIONS

A. Cartridge Fuses:

1. Motor Branch Circuits: Class RK1, time delay.
2. Other Branch Circuits: Class RK1, time delay.
3. Control Transformer Circuits: Class CC, time delay, control transformer duty.
4. Provide open-fuse indicator fuses or fuse covers with open fuse indication.

3.03 INSTALLATION

A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.

B. Install spare-fuse cabinet(s) in location shown on the Drawings or as indicated in the field by Architect.

3.04 IDENTIFICATION

A. Install labels complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems" and indicating fuse replacement information inside of door of each fused switch and adjacent to each fuse block, socket, and holder.

END OF SECTION

SECTION 26 2816

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Nonfusible switches.

1.02 DEFINITIONS

A. NC: Normally closed.

B. NO: Normally open.

C. SPDT: Single pole, double throw.

1.03 COORDINATION

A. Coordinate layout and installation of switches, with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

PART 2 - PRODUCTS

2.01 NONFUSIBLE SWITCHES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
3. Siemens Energy & Automation, Inc.
4. Square D; a brand of Schneider Electric.

B. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Lugs: Mechanical type, suitable for number, size, and conductor material.

2.02 ENCLOSURES

A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.

1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
2. Outdoor Locations: NEMA 250, Type 3R.
3. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.
4. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.

B. Locate disconnect switches to provide working clearance and full accessibility as required by the NEC.

C. Unless indicated otherwise on the drawings, locate disconnect switches adjacent to equipment served.

D. Provide power wiring to and install all disconnect switches and extend feeders to motors or other loads, unless integrally factory mounted on a piece of equipment.

E. Provide power wiring to all roof mounted equipment via roof curb openings provided. Do not penetrate roof membrane with conduit stub ups.

F. Coordinate exact location of motor termination boxes with raceway rough-in provisions to insure correct installation.

G. Connect all heating and air conditioning equipment and have this equipment complete and ready for operation. Contractor shall be responsible for checking equipment manufacturer submittal data to obtain exact location of all electrical connections for equipment before installation.

H. A short section of liquid-tight metallic flexible conduit shall be used at each motor connection.

I. The Division 26 Contractor shall be responsible for the design and installation of seismic restraints for the anchorage of all electrical equipment and conduit systems to the main structural system. Anchorage shall be designed for lateral forces in accordance with local Standard Building Code.

J. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

K. Comply with NECA 1.

3.03 IDENTIFICATION

A. Comply with requirements in Division 26 Section "Identification for Electrical Systems."

1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.04 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Acceptance Testing Preparation:

1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, and feeders.
2. Test continuity of each circuit.

C. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

D. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports, including a certified report that identifies enclosed switches and circuit breakers and that describes scanning results. Include notation of deficiencies detected, remedial action taken and observations after remedial action.

3.05 ADJUSTING

A. Adjust moving parts and operable components to function smoothly and lubricate as recommended by manufacturer.

END OF SECTION

SECTION 26 3213.13

DIESEL-ENGINE-DRIVEN GENERATOR SETS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Diesel engine.
2. Diesel fuel-oil system.
3. Control and monitoring.
4. Generator overcurrent and fault protection.
5. Generator, exciter, and voltage regulator.
6. Vibration isolation devices.

B. Related Requirements:

1. Section 263600 "Transfer Switches" for transfer switches including sensors and relays to initiate automatic-starting and -stopping signals for engine generators.

1.03 DEFINITIONS

A. EPS: Emergency power supply.

B. EPSS: Emergency power supply system.

C. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
2. Include thermal damage curve for generator.
3. Include time-current characteristic curves for generator protective device.
4. Include fuel consumption in gallons per hour (liters per hour) at 0.8 power factor at 0.5, 0.75, and 1.0 times generator capacity.
5. Include generator efficiency at 0.8 power factor at 0.5, 0.75, and 1.0 times generator capacity.
6. Include airflow requirements for cooling and combustion air in cubic feet per minute (cubic meters per minute) at 0.8 power factor, with air-supply temperature of 95, 80, 70, and 50 deg F (35, 27, 21, and 10 deg C). Provide Drawings indicating requirements and limitations for location of air intake and exhausts.
7. Include generator characteristics, including, but not limited to, kilowatt rating, efficiency, reactances, and short-circuit current capability.

B. Shop Drawings:

1. Include plans and elevations for engine generator and other components specified. Indicate access requirements affected by height of subbase fuel tank.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Identify fluid drain ports and clearance requirements for proper fluid drain.
4. Design calculations for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
5. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include base weights.
6. Include diagrams for power, signal, and control wiring. Complete schematic, wiring, and interconnection diagrams showing terminal markings for engine generators and functional relationship between all electrical components.

1.05 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Seismic Qualification Data: Certificates, for engine generator, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: With engine and generator mounted on rails, identify center of gravity and total weight, and each piece of equipment not

integral to the engine generator, and locate and describe mounting and anchorage provisions.

3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

C. Source Quality-Control Reports: Including, but not limited to, the following:

1. Certified summary of prototype-unit test report.
2. Certified Test Reports: For components and accessories that are equivalent, but not identical, to those tested on prototype unit.
3. Report of factory test on units to be shipped for this Project, showing evidence of compliance with specified requirements.
4. Report of sound generation.
5. Report of exhaust emissions showing compliance with applicable regulations.
6. Certified Torsional Vibration Compatibility: Comply with NFPA 110.

D. Field quality-control reports.

E. Warranty: For special warranty.

1.06 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For packaged engine generators to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

a. List of tools and replacement items recommended to be stored at Project for ready access. Include part and drawing numbers, current unit prices, and source of supply.
b. Operating instructions laminated and mounted adjacent to generator location.
c. Training plan.

1.07 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fuses: One for every 10 of each type and rating, but no fewer than one of each.
2. Indicator Lamps: Two for every six of each type used, but no fewer than two of each.
3. Filters: One set each of lubricating oil, fuel, and combustion-air filters.

4. Tools: Each tool listed by part number in operations and maintenance manual.

1.08 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1.09 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of packaged engine generators and associated auxiliary components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Caterpillar, Inc.: Electric Power Division

B. Cummins Power Generation

C. Kohler Power Systems

D. Source Limitations: Obtain packaged engine generators and auxiliary components from single source from single manufacturer.

2.02 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Engine generator housing, day tank, engine generator, batteries, battery racks, silencers, sound attenuating equipment, accessories, and components shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2. Shake-table testing shall comply with ICC-ES AC156. Testing shall be performed with all fluids at worst-case normal levels. Water shall be substituted for diesel fuel in fuel tank during test.
3. Component Importance Factor: 1.5.

B. B11 Compliance: Comply with B11.19.

C. NFPA Compliance:

1. Comply with NFPA 37.
2. Comply with NFPA 70.
3. Comply with NFPA 110 requirements for Level 1 EPSS.

D. Engine Exhaust Emissions: Comply with EPA Tier 2 requirements and applicable state and local government requirements.

E. Noise Emission: Comply with applicable state and local government requirements for maximum noise level at adjacent property boundaries due to sound emitted by engine generator including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation.

F. Environmental Conditions: Engine generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:

1. Ambient Temperature: 41 to 104 deg F (5 to 40 deg C).

2. Relative Humidity: Zero to 95 percent.
3. Altitude: Sea level to 2300 feet (300 m).

2.03 ENGINE GENERATOR ASSEMBLY DESCRIPTION

A. Factory-assembled and -tested, water-cooled engine, with brushless generator and accessories.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

C. Power Rating: Standby.

D. EPSS Class: Engine generator shall be classified as a Class 48 according to NFPA 110.

E. Service Load: 2,000 kW.

F. Power Factor: 0.8, lagging.

G. Frequency: 60 Hz.

H. Voltage: 480-V ac.

I. Phase: Three-phase, four wire, wye.

J. Induction Method: Naturally aspirated.

K. Governor: Adjustable isochronous, with speed sensing.

L. Mounting Frame: Structural steel framework to maintain alignment of mounted components without depending on concrete foundation. Provide lifting attachments sized and spaced to prevent deflection of base during lifting and moving.

M. Capacities and Characteristics:

1. Power Output Ratings: Nominal ratings as indicated at 0.8 power factor excluding power required for the continued and repeated operation of the unit and auxiliaries.
2. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of components.

N. Engine Generator Performance:

1. Steady-State Voltage Operational Bandwidth: 3 percent of rated output voltage from no load to full load.
2. Transient Voltage Performance: Not more than 20 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within three seconds.
3. Steady-State Frequency Operational Bandwidth: 0.5 percent of rated frequency from no load to full load.
4. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
5. Transient Frequency Performance: Less than 5 percent variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within five seconds.

6. Output Waveform: At no load, harmonic content measured line to line or line to neutral shall not exceed 5 percent total and 3 percent for single harmonics. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
7. Sustained Short-Circuit Current: For a three-phase, bolted short circuit at system output terminals, system shall supply a minimum of 250 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to generator system components.
8. Start Time:

    a. Comply with NFPA 110, Type 10 system requirements.

2.04 DIESEL ENGINE

A. Fuel: ASTM D975, diesel fuel oil, Grade 2-D S15.

B. Rated Engine Speed: 1800 rpm.

C. Lubrication System: Engine or skid-mounted.

1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.
2. Thermostatic Control Valve: Control flow in system to maintain optimum oil temperature. Unit shall be capable of full flow and is designed to be fail-safe.
3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.

D. Jacket Coolant Heater: Electric-immersion type, factory installed in coolant jacket system. Comply with UL 499 and with NFPA 110 requirements for Level 1 equipment for heater capacity.

E. Integral Cooling System: Closed loop, liquid cooled, with radiator factory mounted on engine generator set mounting frame and integral engine-driven coolant pump.

1. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
2. Size of Radiator: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
3. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.

4. Coolant Hose: Flexible assembly with inside surface of nonporous rubber and outer covering of aging-, UV-, and abrasion-resistant fabric.

    a. Rating: 50-psig (345-kPa) maximum working pressure with coolant at 180 deg F (82 deg C), and noncollapsible under vacuum.
    b. End Fittings: Flanges or steel pipe nipples with clamps to suit piping and equipment connections.

F. Muffler/Silencer:

1. Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.

    a. Minimum sound attenuation of 25 dB at 500 Hz.
    b. Sound level measured at a distance of 25 feet (8 m) from exhaust discharge after installation is complete shall be 78 dBA or less.

G. Air-Intake Filter: Heavy-duty, engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.

H. Starting System: 24-V electric, with negative ground.

1. Components: Sized so they are not damaged during a full engine-cranking cycle with ambient temperature at maximum specified in "Performance Requirements" Article.
2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.
3. Cranking Cycle: As required by NFPA 110 for system level specified.
4. Battery: Lead acid, with capacity within ambient temperature range specified in "Performance Requirements" Article to provide specified cranking cycle at least twice without recharging.
5. Battery Cable: Size as recommended by engine manufacturer for cable length indicated. Include required interconnecting conductors and connection accessories.
6. Battery Stand: Factory-fabricated, two-tier metal with acid-resistant finish designed to hold the quantity of battery cells required and to maintain the arrangement to minimize lengths of battery interconnections.
7. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35-A minimum continuous rating.
8. Battery Charger: Current-limiting, automatic-equalizing, and float-charging type designed for lead-acid batteries. Unit shall comply with UL 1236 and include the following features:

a. Operation: Equalizing-charging rate of 10 A shall be initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit shall then be automatically switched to a lower float-charging mode and shall continue to operate in that mode until battery is discharged again.
b. Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 40 to 140 deg F (minus 40 to plus 60 deg C) to prevent overcharging at high temperatures and undercharging at low temperatures.
c. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.
d. Ammeter and Voltmeter: Flush mounted in door. Meters shall indicate charging rates.
e. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.
f. Enclosure and Mounting: NEMA 250, Type 1, wall-mounted cabinet.

2.05 DIESEL FUEL-OIL SYSTEM

A. Comply with NFPA 37.

B. Piping: Fuel-oil piping shall be Schedule 40 black steel, complying with requirements in Section 231113 "Facility Fuel-Oil Piping." Cast iron, aluminum, copper, and galvanized steel shall not be used in the fuel-oil system.

C. Main Fuel Pump: Mounted on engine to provide primary fuel flow under starting and load conditions.

D. Fuel Filtering: Remove water and contaminants larger than 1 micron.

E. Relief-Bypass Valve: Automatically regulates pressure in fuel line and returns excess fuel to source.

F. Fuel-Oil Storage Tank: Comply with requirements in Section 231313 "Facility Underground Fuel-Oil Storage Tanks."

1. Fuel Tank Capacity: Minimum 133 percent of total fuel required for periodic maintenance operations between fuel refills plus fuel for the hours of continuous operation required for the indicated EPSS Class..

2. Duplex Fuel-Oil Transfer Pump: Comply with requirements in Section 231213 "Facility Fuel-Oil Pumps."

G. Day Tank: Comply with UL 142, freestanding, factory-fabricated fuel tank assembly, with integral, float-controlled transfer pump and the following features:

1. Containment: Integral rupture basin with a capacity of 150 percent of nominal capacity of day tank.

a. Leak Detector: Locate in rupture basin and connect to provide audible and visual alarm in the event of day-tank leak.

2. Tank Capacity: As recommended by engine manufacturer for an uninterrupted period of 4 hours' operation at 100 percent of rated power output of engine generator system without being refilled.
3. Pump Capacity: Exceeds maximum flow of fuel drawn by engine-mounted fuel supply pump at 110 percent of rated capacity, including fuel returned from engine.
4. Low-Level Alarm Sensor: Liquid-level device operates alarm contacts at 25 percent of normal fuel level.
5. High-Level Alarm Sensor: Liquid-level device operates alarm and redundant fuel shutoff contacts at midpoint between overflow level and 100 percent of normal fuel level.
6. Piping Connections: Factory-installed fuel supply and return lines from tank to engine; local fuel fill, vent line, overflow line; and tank drain line with shutoff valve.

2.06 CONTROL AND MONITORING

A. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of engine generator. When mode-selector switch is switched to the on position, engine generator starts. The off position of same switch initiates engine generator shutdown. When engine generator is running, specified system or equipment failures or derangements automatically shut down engine generator and initiate alarms.

B. Provide minimum run time control set for 15 minutes with override only by operation of a remote emergency-stop switch.

C. Comply with UL 508A.

D. Configuration:

1. Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common control and monitoring panel mounted on the engine generator. Mounting method shall isolate the control panel from engine generator vibration. Panel shall be powered from the engine generator battery.

    a. Wall-Mounting Cabinet Construction: Rigid, self-supporting steel unit complying with NEMA ICS 6.

E. Control and Monitoring Panel:

1. Digital engine generator controller with integrated LCD display, controls, and microprocessor, capable of local and remote control, monitoring, and programming, with battery backup.
2. Instruments: Located on the control and monitoring panel and viewable during operation.

    a. Engine lubricating-oil pressure gage.
    b. Engine-coolant temperature gage.
    c. DC voltmeter (alternator battery charging).
    d. Running-time meter.
    e. AC voltmeter, for each phase.
    f. AC ammeter, for each phase.
    g. AC frequency meter.
    h. Generator-voltage adjusting rheostat.

3. Controls and Protective Devices: Controls, shutdown devices, and common alarm indication, including the following:

    a. Cranking control equipment.
    b. Run-Off-Auto switch.
    c. Control switch not in automatic position alarm.
    d. Overcrank alarm.
    e. Overcrank shutdown device.
    f. Low-water temperature alarm.
    g. High engine temperature prealarm.
    h. High engine temperature.
    i. High engine temperature shutdown device.
    j. Overspeed alarm.
    k. Overspeed shutdown device.
    l. Low fuel main tank.

        1) Low-fuel-level alarm shall be initiated when the level falls below that required for operation for duration required for the indicated EPSS class.

m. Coolant low-level alarm.
n. Coolant low-level shutdown device.
o. EPS load indicator.
p. Battery high-voltage alarm.
q. Low cranking voltage alarm.
r. Battery-charger malfunction alarm.
s. Battery low-voltage alarm.
t. Lamp test.
u. Contacts for local and remote common alarm.
v. Remote manual stop shutdown device.
w. Air shutdown damper alarm when used.
x. Air shutdown damper shutdown device when used.
y. Generator overcurrent-protective-device not-closed alarm.
z. Hours of operation.
aa. Engine generator metering, including voltage, current, hertz, kilowatt, kilovolt ampere, and power factor.

F. Connection to Datalink:

1. A separate terminal block, factory wired to Form C dry contacts, for each alarm and status indication.
2. Provide connections for datalink transmission of indications to remote data terminals via ModBus. Data system connections to terminals are covered in Section 260913 "Electrical Power Monitoring and Control."

G. Remote Alarm Annunciator: An LED indicator light labeled with proper alarm conditions shall identify each alarm event, and a common audible signal shall sound for each alarm condition. Silencing switch in face of panel shall silence signal without altering visual indication. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset. Cabinet and faceplate are surface- or flush-mounting type to suit mounting conditions indicated.

1. Overcrank alarm.
2. Low water-temperature alarm.
3. High engine temperature prealarm.
4. High engine temperature alarm.
5. Low lube oil pressure alarm.
6. Overspeed alarm.
7. Low fuel main tank alarm.
8. Low coolant level alarm.
9. Low cranking voltage alarm.
10. Contacts for local and remote common alarm.

11. Audible-alarm silencing switch.
12. Air shutdown damper when used.
13. Run-Off-Auto switch.
14. Control switch not in automatic position alarm.
15. Fuel tank derangement alarm.
16. Fuel tank high-level shutdown of fuel supply alarm.
17. Lamp test.
18. Low-cranking voltage alarm.
19. Generator overcurrent-protective-device not-closed alarm.

H. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring required to support specified items. Locate sensors and other supporting items on engine or generator unless otherwise indicated.

I. Remote Emergency-Stop Switch: Flush; wall mounted unless otherwise indicated; and labeled. Push button shall be protected from accidental operation.

2.07 GENERATOR OVERCURRENT AND FAULT PROTECTION

A. Overcurrent protective devices shall be coordinated to optimize selective tripping when a short circuit occurs.

1. Overcurrent protective devices for the entire EPSS shall be coordinated to optimize selective tripping when a short circuit occurs. Coordination of protective devices shall consider both utility and EPSS as the voltage source.
2. Overcurrent protective devices for the EPSS shall be accessible only to authorized personnel.

B. Generator Overcurrent Protective Device:

1. Molded-case circuit breaker, electronic-trip type; 100 percent rated; complying with UL 489:

a. Tripping Characteristics: Adjustable long-time and short-time delay and instantaneous.
b. Trip Settings: Selected to coordinate with generator thermal damage curve.
c. Shunt Trip: Connected to trip breaker when engine generator is shut down by other protective devices.
d. Mounting: Adjacent to, or integrated with, control and monitoring panel.

C. Ground-Fault Indication: Comply with NFPA 70, "Emergency System" signals for ground fault.

1. Indicate ground fault with other engine generator alarm indications.

2.08 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

A. Comply with NEMA MG 1.

B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.

C. Electrical Insulation: Class H.

D. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required. Provide six-lead alternator.

E. Range: Provide limited range of output voltage by adjusting the excitation level.

F. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.

G. Enclosure: Dripproof.

H. Instrument Transformers: Mounted within generator enclosure.

I. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified and as required by NFPA 110.

1. Adjusting Rheostat on Control and Monitoring Panel: Provide plus or minus 5 percent adjustment of output-voltage operating band.
2. Maintain voltage within 15 percent on one step, full load.
3. Provide anti-hunt provision to stabilize voltage.
4. Maintain frequency within 5 percent and stabilize at rated frequency within 2 seconds.

J. Strip Heater: Thermostatically controlled unit arranged to maintain stator windings above dew point.

K. Subtransient Reactance: 12 percent, maximum.

2.09 VIBRATION ISOLATION DEVICES

A. Elastomeric Isolator Pads: Oil- and water-resistant elastomer or natural rubber, arranged in single or multiple layers, molded with a nonslip pattern and galvanized-steel baseplates of sufficient stiffness for uniform loading over pad area, and factory cut to sizes that match requirements of supported equipment.

1. Material: Standard neoprene separated by steel shims.

B. Comply with requirements in Section 232116 "Hydronic Piping Specialties" for vibration isolation and flexible connector materials for steel piping.

C. Comply with requirements in Section 233113 "Metal Ducts" for vibration isolation and flexible connector materials for exhaust shroud and ductwork.

D. Vibration isolation devices shall not be used to accommodate misalignments or to make bends.

2.10 FINISHES

A. Indoor and Outdoor Enclosures and Components: Manufacturer's standard finish over corrosion-resistant pretreatment and compatible primer.

2.11 SOURCE QUALITY CONTROL

A. Prototype Testing: Factory test engine generator using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.

1. Tests: Comply with IEEE 115 and with NFPA 110, Level 1 Energy Converters.

B. Project-Specific Equipment Tests: Before shipment, factory test engine generator and other system components and accessories manufactured specifically for this Project. Perform tests at rated load and power factor. Include the following tests:

1. Test components and accessories furnished with installed unit that are not identical to those on tested prototype to demonstrate compatibility and reliability.
2. Test generator, exciter, and voltage regulator as a unit.
3. Full load run.
4. Maximum power.
5. Voltage regulation.
6. Transient and steady-state governing.
7. Single-step load pickup.

8. Safety shutdown.
9. Report factory test results within 10 days of completion of test.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine areas, equipment bases, and conditions, with Installer present, for compliance with requirements for installation and other conditions affecting packaged engine generator performance.

B. Examine roughing-in for piping systems and electrical connections. Verify actual locations of connections before packaged engine generator installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

3.03 INSTALLATION

A. Comply with NECA 1 and NECA 404.

B. Comply with packaged engine generator manufacturers' written installation and alignment instructions and with NFPA 110.

C. Equipment Mounting:

1. Install packaged engine generators on cast-in-place concrete equipment bases. Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."
2. Coordinate size and location of concrete bases for packaged engine generators. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.
3. Install packaged engine generator with elastomeric isolator pads having a minimum deflection of 1 inch (25 mm) on 4-inch- (100-mm-) high concrete base. Secure sets to anchor bolts installed in concrete bases. Concrete base construction is specified in Section 260548.16 "Seismic Controls for Electrical Systems."

D. Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.

E. Exhaust System: Install Schedule 40 black steel piping with welded joints and connect to engine muffler. Install thimble at wall. Piping shall be same diameter as muffler outlet.

1. Piping materials and installation requirements are specified in Section 232113 "Hydronic Piping."
2. Install flexible connectors and steel piping materials according to requirements in Section 232116 "Hydronic Piping Specialties."
3. Insulate muffler/silencer and exhaust system components according to requirements in Section 230719 "HVAC Piping Insulation."
4. Install isolating thimbles where exhaust piping penetrates combustible surfaces with a minimum of 9 inches (225 mm) of clearance from combustibles.

F. Drain Piping: Install condensate drain piping to muffler drain outlet full size of drain connection with a shutoff valve, stainless-steel flexible connector, and Schedule 40 black steel pipe with welded joints.

1. Piping materials and installation requirements are specified in Section 232113 "Hydronic Piping."
2. Drain piping valves, connectors, and installation requirements are specified in Section 232116 "Hydronic Piping Specialties."

G. Fuel Piping:

1. Diesel storage tanks, tank accessories, piping, valves, and specialties for fuel systems are specified in Section 231113 "Facility Fuel-Oil Piping."
2. Copper and galvanized steel shall not be used in the fuel-oil piping system.

H. Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.

3.04 CONNECTIONS

A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping and specialties.

B. Connect fuel, cooling-system, and exhaust-system piping adjacent to packaged engine generator to allow space for service and maintenance.

C. Connect cooling-system water piping to engine generator with flexible connectors.

D. Connect engine exhaust pipe to engine with flexible connector.

E. Connect fuel piping to engines with a gate valve and union and flexible connector.

F. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

G. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables." Provide a minimum of one 90-degree bend in flexible conduit routed to the engine generator from a stationary element.

H. Balance single-phase loads to obtain a maximum of 10 percent unbalance between any two phases.

3.05 IDENTIFICATION

A. Identify system components according to Section 230553 "Identification for HVAC Piping and Equipment" and Section 260553 "Identification for Electrical Systems."

3.06 FIELD QUALITY CONTROL

A. Testing Agency:

1. Perform tests and inspections with the assistance of a factory-authorized service representative.

B. Tests and Inspections:

1. Perform tests recommended by manufacturer and each visual and mechanical inspection and electrical and mechanical test listed in first two subparagraphs below, as specified in NETA ATS. Certify compliance with test parameters.

a. Visual and Mechanical Inspection:

1) Compare equipment nameplate data with Drawings and the Specifications.
2) Inspect physical and mechanical condition.
3) Inspect anchorage, alignment, and grounding.
4) Verify that the unit is clean.

b. Electrical and Mechanical Tests:

1) Perform insulation-resistance tests according to IEEE 43.

a) Machines Larger Than 200 hp (150 kW): Test duration shall be 10 minutes. Calculate polarization index.

2) Test protective relay devices.
3) Verify phase rotation, phasing, and synchronized operation as required by the application.
4) Functionally test engine shutdown for low oil pressure, overtemperature, overspeed, and other protection features as applicable.
5) Verify correct functioning of the governor and regulator.

2. NFPA 110 Acceptance Tests: Perform tests required by NFPA 110 that are additional to those specified here, including, but not limited to, single-step full-load pickup test.

3. Battery Tests: Equalize charging of battery cells according to manufacturer's written instructions. Record individual cell voltages.

a. Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions.
b. Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery.
c. Verify acceptance of charge for each element of the battery after discharge.
d. Verify that measurements are within manufacturer's specifications.

4. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float-charging conditions.
5. System Integrity Tests: Methodically verify proper installation, connection, and integrity of each element of engine generator system before and during system operation. Check for air, exhaust, and fluid leaks.
6. Exhaust Emissions Test: Comply with applicable government test criteria.
7. Voltage and Frequency Transient Stability Tests: Use recording oscilloscope to measure voltage and frequency transients for 50 and 100 percent step-load increases and decreases, and verify that performance is as specified.
8. Harmonic-Content Tests: Measure harmonic content of output voltage at 25 and 100 percent of rated linear load. Verify that harmonic content is within specified limits.
9. Noise Level Tests: Measure A-weighted level of noise emanating from engine generator installation, including engine exhaust and cooling-air intake and discharge, at four locations 25 feet (8 m) from edge of the generator enclosure, and compare measured levels with required values.

C. Coordinate tests with tests for transfer switches and run them concurrently.

D. Test instruments shall have been calibrated within the past 12 months, traceable to NIST Calibration Services, and adequate for making positive observation of test results. Make calibration records available for examination on request.

E. Leak Test: After installation, charge exhaust, coolant, and fuel systems and test for leaks. Repair leaks and retest until no leaks exist.

F. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation for generator and associated equipment.

G. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

H. Remove and replace malfunctioning units and retest as specified above.

I. Retest: Correct deficiencies identified by tests and observations, and retest until specified requirements are met.

J. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations. Attach a label or tag to each tested component indicating satisfactory completion of tests.

K. Infrared Scanning: After Substantial Completion, but not more than 60 days after final acceptance, perform an infrared scan of each power wiring termination and each bus connection while running with maximum load. Remove all access panels so terminations and connections are accessible to portable scanner.

1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan 11 months after date of Substantial Completion.
2. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
3. Record of Infrared Scanning: Prepare a certified report that identifies terminations and connections checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.07 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators.

END OF SECTION

SECTION 26 3323

CENTRAL BATTERY EQUIPMENT

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes UPS central battery inverters.

1.02 DEFINITIONS

A. LCD: Liquid-crystal display.

B. LED: Light-emitting diode.

C. THD: Total harmonic distortion.

D. UPS: Uninterruptible power supply.

1.03 SUBMITTALS

A. Product Data: For the following:

1. Electrical ratings, including the following:

    a. Capacity to provide power during failure of normal ac.
    b. Inverter voltage regulation and THD of output current.
    c. Rectifier data.
    d. Transfer time of transfer switch.
    e. Data for specified optional features.

2. Transfer switch.
3. Inverter.
4. Battery charger.
5. Batteries.
6. Battery monitoring.
7. Battery-cycle warranty monitor.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver equipment in fully enclosed vehicles.

B. Store equipment in spaces having environments controlled within manufacturers' written instructions for ambient temperature and humidity conditions for non-operating equipment.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Bigbeam Emergency Systems, Inc.; Siltron Division.
2. Chloride Systems.
3. Cooper Industries, Inc.; Sure-Lites Division.
4. Crucial Power Products.
5. Dual-Lite.
6. Hubbell Incorporated; Hubbell Lighting.
7. Lightguard/Chloride Systems.
8. Lithonia Lighting; Emergency Lighting Systems.
9. Thomas & Betts Corporation; Emergi-Lite Division.
10. Thomas & Betts Corporation; Lightalarms Division.

2.02 INVERTER PERFORMANCE REQUIREMENTS

A. UPS-Type Central Battery Inverters: Continuously provide ac power to connected electrical system.

1. Automatic Operation:

a. Normal Conditions: Supply the load with ac power flowing from normal ac power input terminals, through rectifier-charger and inverter, with battery connected in parallel with rectifier-charger output.
b. Abnormal Supply Conditions: If normal ac supply deviates from specified and adjustable voltage, voltage waveform, or frequency limits, battery supplies constant, regulated, inverter ac power output to the load without switching or disturbance.
c. If normal power fails, battery continues supply-regulated ac power through the inverter to the load without switching or disturbance.

d. When power is restored at normal supply terminals of system, controls automatically synchronize inverter with the external source before transferring the load. Rectifier-charger then supplies power to the load through the inverter and simultaneously recharges battery.
e. If battery becomes discharged and normal supply is available, rectifier-charger charges battery. When battery is fully charged, rectifier-charger automatically shifts to float-charge mode.
f. If any element of central battery inverter system fails and power is available at normal supply terminals of system, static bypass transfer switch transfers the load to normal ac supply circuit without disturbance or interruption of supply.
g. If a fault occurs in system supplied by central battery inverter and current flows in excess of the overload rating of central battery inverter system, static bypass transfer switch operates to bypass fault current to normal ac supply circuit for fault clearing.
h. When fault has cleared, static bypass transfer switch returns the load to central battery inverter system.
i. If battery is disconnected, central battery inverter continues to supply power to the load with no degradation of its regulation of voltage and frequency of output bus.

2. Manual Operation:

a. Turning inverter off causes static bypass transfer switch to transfer the load directly to normal ac supply circuit without disturbance or interruption.
b. Turning inverter on causes static bypass transfer switch to transfer the load to inverter.

2.03 INVERTERS

A. Description: Solid-state type, with the following operational features:

1. Automatically regulate output voltage to within plus or minus 5 percent.
2. Automatically regulate output frequency to within plus or minus 1 Hz, from no load to full load at unit power factor over the operating range of battery voltage.
3. Output Voltage Waveform of Unit: Sine wave with maximum 10 percent THD throughout battery operating-voltage range, from no load to full load.

a. THD may not exceed 5 percent when serving a resistive load of 100 percent of unit rating.

4. Output Protection: Current-limiting and short-circuit protection.

2.04 BATTERY CHARGER

A. Description: Solid-state, automatically maintaining batteries in fully charged condition when normal power is available. With LED indicators for "float" and "high-charge" modes.

2.05 BATTERIES

A. Description: Premium, valve-regulated, recombinant, lead-calcium batteries.

1. Capable of sustaining full-capacity output of inverter unit for minimum of 90 minutes.

2.06 ENCLOSURES

A. NEMA 250, Type 1 steel cabinets with access to components through hinged doors with flush tumbler lock and latch.

B. Finish: Manufacturer's standard baked-enamel finish over corrosion-resistant prime treatment.

2.07 CONTROL AND INDICATION

A. Description: Group displays, indications, and basic system controls on common control panel on front of central battery inverter enclosure.

B. Minimum displays, indicating devices, and controls shall include those in lists below. Provide sensors, transducers, terminals, relays, and wiring required to support listed items. Alarms shall include an audible signal and a visual display.

1. Basic Status Condition Indications:

a. Normal operation.
b. Load-on bypass.
c. Load-on battery.
d. Inverter off.
e. Alarm condition exists.

2. Alarm Indications:

a. Battery system alarm.
b. Control power failure.
c. Fan failure.
d. Overload.
e. Battery-charging control faulty.

f. Input overvoltage or undervoltage.
g. Approaching end of battery operation.
h. Battery undervoltage shutdown.
i. Inverter fuse blown.
j. Inverter transformer overtemperature.
k. Inverter overtemperature.
l. Static bypass transfer switch overtemperature.
m. Inverter power supply fault.
n. Inverter output overvoltage or undervoltage.
o. System overload shutdown.
p. Inverter output contactor open.
q. Inverter current limit.

3. Controls:

a. Inverter on-off.
b. Start.
c. Battery test.
d. Alarm silence/reset.
e. Output-voltage adjustment.

C. Include the following minimum array:

1. Ready, normal-power on light.
2. Charge light.
3. Inverter supply load light.
4. Battery voltmeter.
5. AC output voltmeter with minimum accuracy of 2 percent of full scale.
6. Load ammeter.
7. Test switch to simulate ac failure.

D. Enclosure: Steel, with hinged lockable doors, suitable for above ceiling mounting. Manufacturer's standard corrosion-resistant finish.

2.08 OUTPUT DISTRIBUTION SECTION

A. Panelboard: Comply with Division 26 Section "Panelboards" except provide assembly integral to equipment cabinet.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine areas and conditions for compliance with requirements for ventilation, temperature, humidity, and other conditions affecting performance.

1. Verify that manufacturer's written instructions for environmental conditions have been permanently established in spaces where equipment will be installed, before installation begins.

B. Examine roughing-in for electrical connections to verify actual locations of connections before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install system components above ceiling and secure per manufacturer’s recommendations.

B. Maintain minimum clearances and workspace at equipment according to manufacturer's written instructions and NFPA 70.

3.03 CONNECTIONS

A. Connections: Interconnect system components. Make connections to supply and load circuits according to manufacturer's wiring diagrams, unless otherwise indicated.

B. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

1. Separately Derived Systems: Make grounding connections to grounding electrodes and bonding connections to metallic piping systems as indicated; comply with NFPA 70.

C. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.04 IDENTIFICATION

A. Identify equipment and components according to Division 26 Section "Identification for Electrical Systems."

3.05 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections:

1. Inspect interiors of enclosures for integrity of mechanical and electrical connections, component type and labeling verification, and ratings of installed components.
2. Test manual and automatic operational features and system protective and alarm functions.
3. Test communication of status and alarms to remote monitoring equipment.
4. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specifications. Certify compliance with test parameters.
5. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Remove and replace malfunctioning units and retest as specified above.

3.06 STARTUP SERVICE

A. Verify that central battery inverter is installed and connected according to the Contract Documents.

B. Verify that electrical wiring installation complies with manufacturer's submittal and installation requirements in Division 26 Sections.

C. Complete installation and startup checks according to manufacturer's written instructions.

3.07 ADJUSTING AND CLEANING

A. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

3.08 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain central battery inverters.

END OF SECTION

SECTION 26 3600

TRANSFER SWITCHES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:
1. Contactor-type automatic transfer switches.
2. Molded-case-type automatic transfer switches.
3. Nonautomatic transfer switches.
4. Transfer switch accessories.

1.03 ACTION SUBMITTALS

A. Product Data: For each type of product.
1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for transfer switches.
2. Include rated capacities, operating characteristics, electrical characteristics, and accessories.

B. Shop Drawings:
1. Include plans, elevations, sections, details showing minimum clearances, conductor entry provisions, gutter space, and installed features and devices.
2. Include material lists for each switch specified.
3. Single-Line Diagram: Show connections between transfer switch,power sources, and load; and show interlocking provisions for each combined transfer switch and bypass/isolation switch.

1.04 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer-authorized service representative.

B. Seismic Qualification Data: Certificates, for transfer switches, accessories, and components, from manufacturer.
   1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
   2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
   3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

C. Field quality-control reports.

1.05 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals.
   1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
      a. Features and operating sequences, both automatic and manual.
      b. List of all factory settings of relays; provide relay-setting and calibration instructions, including software, where applicable.

1.06 QUALITY ASSURANCE

A. Testing Agency Qualifications:
   1. Member company of NETA.
      a. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

1.07 FIELD CONDITIONS

1.08 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of transfer switch or transfer switch components that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: 12 months from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NEMA ICS 1.

C. Comply with UL 1008 unless requirements of these Specifications are stricter.

D. Tested Fault-Current Closing and Short-Circuit Ratings: Adequate for duty imposed by protective devices at installation locations in Project under the fault conditions indicated, based on testing according to UL 1008.
   1. Short-time withstand capability for three cycles.

E. Repetitive Accuracy of Solid-State Controls: All settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.

F. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage -surge withstand capability requirements when tested according to IEEE C62.62. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.

G. Electrical Operation: Accomplish by a non-fused, momentarily energized solenoid or electric-motor-operated mechanism. Switches for emergency or standby purposes shall be mechanically and electrically interlocked in both directions to prevent simultaneous connection to both power sources unless closed transition.

H. Service-Rated Transfer Switch:
   1. Comply with UL 869A and UL 489.
   2. Provide terminals for bonding the grounding electrode conductor to the grounded service conductor.
   3. In systems with a neutral, the bonding connection shall be on the neutral bus.
   4. Provide removable link for temporary separation of the service and load grounded conductors.
   5. Surge Protective Device: Service rated.
   6. Ground-Fault Protection: Comply with UL 1008 for normal bus.
   7. Service Disconnecting Means: Externally operated, manual mechanically actuated.

I. Neutral Terminal: Solid and fully rated unless otherwise indicated.

J. Annunciation, Control, and Programming Interface Components: Devices at transfer switches for communicating with remote programming devices, annunciators, or annunciator and control panels shall have communication capability matched with remote device.

K. Factory Wiring: Train and bundle factory wiring and label, consistent with Shop Drawings, by color-code or by numbered or lettered wire and cable with printed markers at terminations. Color-coding and wire and cable markers are specified in Section 260553 "Identification for Electrical Systems."

L. Identification for Electrical Systems.
1. Designated Terminals: Pressure type, suitable for types and sizes of field wiring indicated.
2. Power-Terminal Arrangement and Field-Wiring Space: Suitable for top, side, or bottom entrance of feeder conductors as indicated.
3. Control Wiring: Equipped with lugs suitable for connection to terminal strips.
4. Accessible via rear access.

M. Enclosures: General-purpose NEMA 250, Type 1, complying with NEMA ICS 6 and UL 508, unless otherwise indicated.

2.02 CONTACTOR-TYPE AUTOMATIC TRANSFER SWITCHES
1. Caterpillar, Inc; Electric Power Division
2. Cummins Power Generation
3. Kohler Power Systems
4. Russelectric, Inc
5. Vertiv; Vertiv Holdings Co.

A. Comply with Level 1 equipment according to NFPA 110.

B. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.
1. Limitation: Switches using molded-case switches or circuit breakers or insulated-case circuit-breaker components are unacceptable.
2. Switch Action: Double throw; mechanically held in both directions.
3. Contacts: Silver composition or silver alloy for load-current switching. Contactor-style automatic transfer-switch units, rated 600 A and higher, shall have separate arcing contacts.
4. Conductor Connectors: Suitable for use with conductor material and sizes.
5. Material: Tin-plated aluminum.

6. Main and Neutral Lugs: Compression type.
7. Ground Lugs and Bus-Configured Terminators: Compression type.
8. Connectors shall be marked for conductor size and type according to UL 1008.

C. Automatic Open-Transition Transfer Switches: Interlocked to prevent the load from being closed on both sources at the same time.
   1. Sources shall be mechanically and electrically interlocked to prevent closing both sources on the load at the same time.

D. Manual Switch Operation, Load-Breaking: Under load, with door closed and with either or both sources energized. Transfer time is same as for electrical operation. Control circuit automatically disconnects from electrical operator during manual operation.

E. Digital Communication Interface: Matched to capability of remote annunciator or annunciator and control panel.

F. Automatic Transfer-Switch Controller Features:
   1. Controller operates through a period of loss of control power.
   2. Undervoltage Sensing for Each Phase of Normal Source: Sense low phase-to-ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage shall be adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.
   3. Voltage/Frequency Lockout Relay: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.
   4. of nominal. Factory set for pickup at 95 percent.
   5. Time Delay for Retransfer to Normal Source: Adjustable from zero to 30 minutes, and factory set for 10 minutes. Override shall automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.
   6. Test Switch: Simulate normal-source failure.
   7. Switch-Position Pilot Lights: Indicate source to which load is connected.
   8. Source-Available Indicating Lights: Supervise sources via transfer-switch normal- and emergency-source sensing circuits.
      a. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."
      b. Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available."
   9. Unassigned Auxiliary Contacts: Two normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.

10. Transfer Override Switch: Overrides automatic retransfer control so transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.
11. Engine Starting Contacts: One isolated and normally closed, and one isolated and normally open; rated 10 A at 32-V dc minimum.
12. Engine Shutdown Contacts:
    a. Instantaneous; shall initiate shutdown sequence at remote engine-generator controls after retransfer of load to normal source.
13. Engine-Generator Exerciser: Solid-state, programmable-time switch starts engine generator and transfers load to it from normal source for a preset time, then retransfers and shuts down engine after a preset cool-down period. Initiates exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods shall be adjustable from 10 to 30 minutes. Factory settings shall be for 7-day exercise cycle, 20-minute running period, and 5-minute cool-down period. Exerciser features include the following:
14. for 7-day exercise cycle, 20-minute running period, and 5-minute cool-down period. Exerciser features include the following:
    a. Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.
    b. Push-button programming control with digital display of settings.
    c. Integral battery operation of time switch when normal control power is unavailable.

1.02 TRANSFER SWITCH ACCESSORIES

1.03 SOURCE QUALITY CONTROL

A. Prepare test and inspection reports.
   1. For each of the tests required by UL 1008, performed on representative devices, for emergency systems. Include results of test for the following conditions:
      a. Overvoltage.
      b. Undervoltage.
      c. Loss of supply voltage.
      d. Reduction of supply voltage.
      e. Alternative supply voltage or frequency is at minimum acceptable values.
      f. Temperature rise.
      g. Dielectric voltage-withstand; before and after short-circuit test.
      h. Overload.
      i. Contact opening.
      j. Endurance.
      k. Short circuit
      l. Short-time current capability
      m. Receptacle withstand capability.
      n. Insulating base and supports damage.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Floor-Mounting Switch: Anchor to floor by bolting.
   1. Install transfer switches on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."
   2. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases.
   3. Provide workspace and clearances required by NFPA 70.

B. Identify components according to Section 260553 "Identification for Electrical Systems."

C. Set field-adjustable intervals and delays, relays, and engine exerciser clock.

D. Comply with NECA 1.

3.02 CONNECTIONS

A. Wiring Method: Install cables in raceways and cable trays except within electrical enclosures. Conceal raceway and cables except in unfinished spaces.
   1. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."

B. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

C. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

D. Route and brace conductors according to manufacturer's written instructions and Section 260529 "Hangers and Supports for Electrical Systems." Do not obscure manufacturer's markings and labels.

E. Brace and support equipment according to Section 260548.16 "Seismic Controls for Electrical Systems."

F. Final connections to equipment shall be made with liquidtight, flexible metallic conduit no more than 18 inches (457 mm) in length.

3.03 FIELD QUALITY CONTROL

A. Administrant for Tests and Inspections:
   1. Administer and perform tests and inspections with assistance of factory-authorized service representative.

B. Tests and Inspections:
   1. After installing equipment, test for compliance with requirements according to NETA ATS.
   2. Visual and Mechanical Inspection:
      a. Compare equipment nameplate data with Drawings and Specifications.
      b. Inspect physical and mechanical condition.
      c. Inspect anchorage, alignment, grounding, and required clearances.
      d. Verify that the unit is clean.
      e. Verify appropriate lubrication on moving current-carrying parts and on moving and sliding surfaces.
      f. Verify that manual transfer warnings are attached and visible.
      g. Verify tightness of all control connections.
      h. Inspect bolted electrical connections for high resistance using one of the following methods, or both:
         1) Use of low-resistance ohmmeter.
         2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method according to manufacturer's published data.
      i. Perform manual transfer operation.
      j. Verify positive mechanical interlocking between normal and alternate sources.
      k. Perform visual and mechanical inspection of surge arresters.
      l. Inspect control power transformers.
         1) Inspect for physical damage, cracked insulation, broken leads, tightness of connections, defective wiring, and overall general condition.
         2) Verify that primary and secondary fuse or circuit-breaker ratings match Drawings.
         3) Verify correct functioning of drawout disconnecting contacts, grounding contacts, and interlocks.
   3. Electrical Tests:
      a. Perform insulation-resistance tests on all control wiring with respect to ground.
      b. Perform a contact/pole-resistance test. Compare measured values with manufacturer's acceptable values.
      c. Verify settings and operation of control devices.
      d. Calibrate and set all relays and timers.
      e. Verify phase rotation, phasing, and synchronized operation.

f. Perform automatic transfer tests.
g. Verify correct operation and timing of the following functions:
1) Normal source voltage-sensing and frequency-sensing relays.
2) Engine start sequence.
3) Time delay on transfer.
4) Alternative source voltage-sensing and frequency-sensing relays.
5) Automatic transfer operation.
6) Interlocks and limit switch function.
7) Time delay and retransfer on normal power restoration.
8) Engine cool-down and shutdown feature.

4. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Include external annunciation and control circuits. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.
a. Check for electrical continuity of circuits and for short circuits.
b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.
c. Verify that manual transfer warnings are properly placed.
d. Perform manual transfer operation.

5. After energizing circuits, perform each electrical test for transfer switches stated in NETA ATS and demonstrate interlocking sequence and operational function for each switch at least three times.
a. Simulate power failures of normal source to automatic transfer switches and retransfer from emergency source with normal source available.
b. Simulate loss of phase-to-ground voltage for each phase of normal source.
c. Verify time-delay settings.
d. Verify pickup and dropout voltages by data readout or inspection of control settings.
e. Test bypass/isolation unit functional modes and related automatic transfer-switch operations.
f. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.

6. Ground-Fault Tests: Coordinate with testing of ground-fault protective devices for power delivery from both sources.
a. Verify grounding connections and locations and ratings of sensors.

C. Coordinate tests with tests of generator and run them concurrently.

D. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.

E. Transfer switches will be considered defective if they do not pass tests and inspections.

F. Remove and replace malfunctioning units and retest as specified above.

G. Prepare test and inspection reports.

H. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switch. Remove all access panels so joints and connections are accessible to portable scanner.
   1. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
   2. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
   3. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.

3.04 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment.

B. Training shall include testing ground-fault protective devices and instructions to determine when the ground-fault system shall be retested. Include instructions on where ground-fault sensors are located and how to avoid negating the ground-fault protection scheme during testing and circuit modifications.

C. Coordinate this training with that for generator equipment.

END OF SECTION

SECTION 26 4313

TRANSIENT-VOLTAGE SUPPRESSION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes field-mounted TVSS for low-voltage (120 to 600 V) power distribution and control equipment.

1.02 DEFINITIONS

A. ATS: Acceptance Testing Specifications.

B. SVR: Suppressed voltage rating.

C. TVSS: Transient voltage surge suppressor(s), both singular and plural; also, transient voltage surge suppression.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating weights, electrical characteristics, furnished specialties, and accessories.

B. Service Conditions: Rate TVSS devices for continuous operation under the following conditions unless otherwise indicated:

1. Maximum Continuous Operating Voltage: Not less than 115 percent of nominal system operating voltage.
2. Operating Temperature: 30 to 120 deg F.
3. Humidity: 0 to 85 percent, noncondensing.
4. Altitude: Less than 20,000 feet above sea level.

1.04 COORDINATION

A. Coordinate location of field-mounted TVSS devices to allow adequate clearances for maintenance.

PART 2 - PRODUCTS

2.01 SERVICE ENTRANCE SUPPRESSORS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. ABB USA.
2. AC Data Solutions.
3. Advanced Protection Technologies Inc. (APT).
4. Atlantic Scientific.
5. Current Technology Inc.; Danaher Power Solutions.
6. Danaher Power Solutions; United Power Products.
7. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
8. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
9. Intermatic, Inc.
10. LEA International.
11. Leviton Mfg. Company Inc.
12. Liebert Corporation; a division of Emerson Network Power.
13. Northern Technologies, Inc.; a division of Emerson Network Power.
14. Siemens Energy & Automation, Inc.
15. Square D; a brand of Schneider Electric.
16. Surge Suppression Incorporated.

B. Surge Protection Devices:

1. Comply with UL 1449.
2. Modular design (with field-replaceable modules).
3. Arrangement with copper bus bars and for bolted connections to phase buses, neutral bus, and ground bus.
4. LED indicator lights for power and protection status.
5. Audible alarm, with silencing switch, to indicate when protection has failed.
6. Form-C contacts rated at 5 A and 250-V ac, one normally open and one normally closed, for remote monitoring of protection status. Contacts shall reverse on failure of any surge diversion module or on opening of any current-limiting device. Coordinate with building power monitoring and control system.
7. Six-digit transient-event counter set to totalize transient surges.

C. Peak Single-Impulse Surge Current Rating: 80 kA per mode/160 kA per phase.

D. Minimum single impulse current ratings, using 8-by-20-mic.sec waveform described in IEEE C62.41.2

1. Line to Neutral: 70,000 A.

2. Line to Ground: 70,000 A.
3. Neutral to Ground: 50,000 A.

E. Protection modes and UL 1449 SVR for grounded wye circuits with 208Y/120 V, 3-phase, 4-wire circuits shall be as follows:

1. Line to Neutral: 400 V for 208Y/120 V.
2. Line to Ground: 400 V for 208Y/120 V.
3. Neutral to Ground: 400 V for 208Y/120 V.

2.02 ENCLOSURES

A. Indoor Enclosures: NEMA 250 Type 1.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install TVSS devices at service entrance on load side, with ground lead bonded to service entrance ground.

3.02 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

1. Verify that electrical wiring installation complies with manufacturer's written installation requirements.

B. Perform tests and inspections.

C. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA ATS, "Surge Arresters, Low-Voltage Surge Protection Devices" Section. Certify compliance with test parameters.
2. After installing TVSS devices but before electrical circuitry has been energized, test for compliance with requirements.
3. Complete startup checks according to manufacturer's written instructions.

D. TVSS device will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.03 STARTUP SERVICE

A. Do not energize or connect service entrance equipment to their sources until TVSS devices are installed and connected.

3.04 DEMONSTRATION

A. Train Owner's maintenance personnel to maintain TVSS devices.

END OF SECTION

SECTION 26 5000

COMMISSIONING OF LIGHTING SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes requirements that apply to the commissioning process for lighting systems.

1.02 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

B. The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the test by the basic designation only.
1. IES – (9th Edition) The IESNA Lighting Handbook

1.03 SUBMITTALS

A. Draft Prefunctional Checklists. Starting 4 weeks before substantial completion, submit weekly progress copies of the prefunctional checklists to the Owner.

B. Final Prefunctional Checklists. Complete and submit a copy of prefunctional checklists provided in Appendix A.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. Provide test equipment as necessary for start-up and testing of light fixtures. Test equipment shall be of sufficient quality and accuracy to test and/or measure system performance dictated by the Acceptance Criteria and the Prefunctional Checklists.

PART 3 - EXECUTION

3.1 MEETINGS

A. Attend a pre-construction commissioning meeting where the commissioning process and schedule will be reviewed. Meeting may take place via telephone.

B. Attend a mid-construction commissioning meeting. Provide a copy of the prefunctional checklists in Appendix A showing the construction progress.

C. Attend a functional test pre-action meeting. This meeting shall occur after the prefunctional checklists are completed and submitted to the Owner. Ensure that the individual who attends this meeting has the authority to schedule personnel who will be completing the functional tests.

3.2 SCHEDULING

A. Functional testing shall begin after Prefunctional Checklists are completed, submitted to the Owner, and approved.

3.3 PARTICIPATION IN COMMISSIONING

B. Designate Contractor team members to participate in the Prefunctional Checklists and the Functional Tests specified herein. The team members shall be as follows:

1. Contractor’s Electrical Representative
2. Owner’s Project Manager
3. Owner’s Property Manager
4. Owner’s Commissioning Authority

C. Prefunctional Checklists and Functional Tests shall be completed by the commissioning team under direct guidance of the Commissioning Authority. Acceptance by each commissioning team member of each Prefunctional Checklist shall be indicated by signature and date. Acceptance by each commissioning team member of each functional test shall be indicated by signature and date.

3.4 ADDITIONAL COMMISSIONING

A. Additional commissioning activities may be required after system adjustments, replacements, and similar activities are completed. The Contractor, suppliers, and Commissioning Authority shall include a reasonable reserve to complete this work as part of their standard contractual obligations.

END OF SECTION

SECTION 26 5119

LED INTERIOR LIGHTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Materials.
2. Luminaire support.

B. Related Requirements:

1. Section 260923 "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.
2. Luminaire Schedule on Drawings.

1.03 DEFINITIONS

A. CCT: Correlated color temperature.

B. CRI: Color Rendering Index.

C. Fixture: See "Luminaire."

D. IP: International Protection or Ingress Protection Rating.

E. LED: Light-emitting diode.

F. Lumen: Measured output of lamp and luminaire, or both.

G. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Arrange in order of luminaire designation.
2. Include data on features, accessories, and finishes.
3. Include physical description and dimensions of luminaires.
4. Include emergency lighting units, including batteries and chargers.
5. Include life, output (lumens, CCT, and CRI), and energy-efficiency data.
6. Photometric data and adjustment factors based on laboratory tests.

a. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.

b. Testing Agency Certified Data: For indicated luminaires, photometric data certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.

B. Product Schedule: For luminaires and lamps. Use same designations indicated on Drawings.

1.05 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing laboratory providing photometric data for luminaires.

B. Product Certificates: For each type of luminaire.

C. Sample warranty.

1.06 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.

1. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.

1.07 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications:

1. Luminaire manufacturer's laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.

2. Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7, accredited under the NVLAP for Energy Efficient Lighting Products, and complying with the applicable IES testing standards.

B. Provide luminaires from a single manufacturer for each luminaire type.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.09 WARRANTY

A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.

B. Warranty Period: Five year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Ambient Temperature: 41 to 104 deg F (5 to 40 deg C).

1. Relative Humidity: Zero to 95 percent.

B. Altitude: Sea level to 1000 feet (300 m).

2.02 LUMINAIRE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.

1. Label shall include the following lamp characteristics:

a. "USE ONLY" and include specific lamp type.

b. Lamp diameter, shape, size, wattage, and coating.

c. CCT and CRI.

C. Recessed luminaires shall comply with NEMA LE 4.

D. NRTL Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by an NRTL.

2.03 MATERIALS

A. Metal Parts:

1. Free of burrs and sharp corners and edges.

2. Sheet metal components shall be steel unless otherwise indicated.

3. Form and support to prevent warping and sagging.

B. Steel:

1. ASTM A36/A36M for carbon structural steel.

2. ASTM A568/A568M for sheet steel.

C. Stainless Steel:

1. Manufacturer's standard grade.

2. Manufacturer's standard type, ASTM A240/240M.

D. Galvanized Steel: ASTM A653/A653M.

E. Aluminum: ASTM B209.

2.04 METAL FINISHES

A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.05 LUMINAIRE SUPPORT

A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

B. Single-Stem Hangers: 1/2-inch (13-mm) steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.

C. Wires: ASTM A641/A641M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm).

D. Rod Hangers: 3/16-inch (5-mm) minimum diameter, cadmium-plated, threaded steel rod.

E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before luminaire installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 TEMPORARY LIGHTING

A. If approved by the Architect, use selected permanent luminaires for temporary lighting. When construction is sufficiently complete, clean luminaires used for temporary lighting and install new lamps.

3.03 INSTALLATION

A. Comply with NECA 1.

B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.

C. Install lamps in each luminaire.

D. Supports:

1. Sized and rated for luminaire weight.
2. Able to maintain luminaire position after cleaning and relamping.
3. Provide support for luminaire without causing deflection of ceiling or wall.

4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.

E. Flush-Mounted Luminaires:

1. Secured to outlet box.
2. Attached to ceiling structural members at four points equally spaced around circumference of luminaire.
3. Trim ring flush with finished surface.

F. Suspended Luminaires:

1. Ceiling Mount:
   a. Two 5/32-inch- (4-mm-) diameter aircraft cable supports adjustable to 10 feet (3 m) in length.
2. Pendants and Rods: Where longer than 48 inches (1200 mm), brace to limit swinging.
3. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.
4. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of luminaire chassis, including one at each end.
5. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.

G. Ceiling-Grid-Mounted Luminaires:

1. Secure to any required outlet box.
2. Secure luminaire to the luminaire opening using approved fasteners in a minimum of four locations, spaced near corners of luminaire.
3. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.

H. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

3.04 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.05 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.

2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.

B. Luminaire will be considered defective if it does not pass operation tests and inspections.

C. Prepare test and inspection reports.

3.06 STARTUP SERVICE

A. Comply with requirements for startup specified in Section 260943.23 "Relay-Based Lighting Controls."

3.07 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting the direction of aim of luminaires to suit occupied conditions. Make up to two visits to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.

1. During adjustment visits, inspect all luminaires. Replace lamps or luminaires that are defective.

2. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

3. Adjust the aim of luminaires in the presence of the Architect.

END OF SECTION

SECTION 26 5213

EMERGENCY AND EXIT LIGHTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Emergency lighting.
2. Exit signs.
3. Materials.
4. Luminaire support components.

1.03 DEFINITIONS

A. CCT: Correlated color temperature.

B. CRI: Color Rendering Index.

C. Emergency Lighting Unit: A lighting unit with internal or external emergency battery powered supply and the means for controlling and charging the battery and unit operation.

D. Fixture: See "Luminaire" Paragraph.

E. Lumen: Measured output of lamp and luminaire, or both.

F. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of emergency lighting unit, exit sign, and emergency lighting support.

1. Include data on features, accessories, and finishes.
2. Include physical description of the unit and dimensions.
3. Battery and charger for light units.
4. Include life, output of luminaire (lumens, CCT, and CRI), and energy-efficiency data.
5. Include photometric data and adjustment factors based on laboratory tests, complying with IES LM-45, for each luminaire type.

a. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.

B. Product Schedule:

1. For exit signs. Use same designations indicated on Drawings.

1.05 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing laboratory providing photometric data for luminaires.

B. Product Certificates: For each type of luminaire.

C. Sample Warranty: For manufacturer's warranty.

1.06 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For luminaires and lighting systems to include in emergency, operation, and maintenance manuals.

1. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.

1.07 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications: Luminaire manufacturer's laboratory that is accredited under National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products and complying with applicable IES testing standards.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.09 WARRANTY

A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS FOR EMERGENCY LIGHTING

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. NRTL Compliance: Fabricate and label emergency lighting units, exit signs, and batteries to comply with UL 924.

C. Comply with NFPA 70 and NFPA 101.

D. Comply with NEMA LE 4 for recessed luminaires.

E. Comply with UL 1598 for fluorescent luminaires.

F. Lamp Base: Comply with ANSI C81.61.

G. Bulb Shape: Complying with ANSI C79.1.

H. Internal Type Emergency Power Unit: Self-contained, modular, battery-inverter unit, factory mounted within luminaire body.

1. Emergency Connection: Operate one lamp(s) continuously at an output of 1100 lumens each upon loss of normal power. Connect unswitched circuit to battery-inverter unit and switched circuit to luminaire ballast.

2. Operation: Relay automatically turns lamp on when power-supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.

3. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:

a. Ambient Temperature: Less than 0 deg F (minus 18 deg C) or exceeding 104 deg F (40 deg C), with an average value exceeding 95 deg F (35 deg C) over a 24-hour period.

b. Ambient Storage Temperature: Not less than minus 4 deg F (minus 20 deg C) and not exceeding 140 deg F (60 deg C).

c. Humidity: More than 95 percent (condensing).

d. Altitude: Exceeding 3300 feet (1000 m).

4. Nightlight Connection: Operate lamp continuously at 40 percent of rated light output.

5. Test Push-Button and Indicator Light: Visible and accessible without opening luminaire or entering ceiling space.

a. Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.

b. Indicator Light: LED indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

6. Battery: Sealed, maintenance-free, nickel-cadmium type.

7. Charger: Fully automatic, solid-state, constant-current type with sealed power transfer relay.

8. Remote Test: Switch in handheld remote device aimed in direction of tested unit initiates coded infrared signal. Signal reception by factory-installed infrared receiver in tested unit triggers simulation of loss of its normal power supply, providing visual confirmation of either proper or failed emergency response.

9. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and a flashing red LED.

I. External Type: Self-contained, modular, battery-inverter unit, suitable for powering one or more lamps, remote mounted from luminaire.

1. Emergency Connection: Operate one LED lamp continuously. Connect unswitched circuit to battery-inverter unit and switched circuit to luminaire.
2. Operation: Relay automatically turns lamp on when power-supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
3. Nightlight Connection: Operate lamp in a remote luminaire continuously.
4. Battery: Sealed, maintenance-free, nickel-cadmium type.
5. Charger: Fully automatic, solid-state, constant-current type.
6. Housing: NEMA 250, Type 1 enclosure listed for installation inside, on top of, or remote from luminaire. Remote assembly shall be located no less than half the distance recommended by the emergency power unit manufacturer, whichever is less.
7. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
8. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
9. Remote Test: Switch in handheld remote device aimed in direction of tested unit initiates coded infrared signal. Signal reception by factory-installed infrared receiver in tested unit triggers simulation of loss of its normal power supply, providing visual confirmation of either proper or failed emergency response.
10. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and a flashing red LED.

2.02 EMERGENCY LIGHTING

A. General Requirements for Emergency Lighting Units: Self-contained units.

B. Emergency Luminaires:

1. Emergency Luminaires: As indicated on Drawings, with the following additional features:
   a. Operating at nominal voltage of 120 V ac.
   b. Internal or external emergency power unit, as required by luminaire.
   c. Rated for installation in damp locations, and for sealed and gasketed luminaires in wet locations.

d. UL 94 5VA flame rating.

2.03 EXIT SIGNS

A. General Requirements for Exit Signs: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.

B. Internally Lighted Signs:

1. Operating at nominal voltage of 120 V ac.
2. Lamps for AC Operation:
   a. LEDs; 50,000 hours minimum rated lamp life.
3. Self-Powered Exit Signs (Battery Type): Internal emergency power unit.

2.04 MATERIALS

A. Metal Parts:

1. Free of burrs and sharp corners and edges.
2. Sheet metal components shall be steel unless otherwise indicated.
3. Form and support to prevent warping and sagging.

B. Doors, Frames, and Other Internal Access:

1. Smooth operating, free of light leakage under operating conditions.
2. Designed to permit relamping without use of tools.
3. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

C. Housings:

1. Extruded aluminum.
2. Clear finish.

D. Conduit: Electrical metallic tubing, minimum 3/4 inch (21 mm) in diameter.

2.05 METAL FINISHES

A. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.06 LUMINAIRE SUPPORT COMPONENTS

A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

B. Support Wires: ASTM A641/A641M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm).

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for conditions affecting performance of luminaires.

B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before luminaire installation.

C. Examine walls, floors, roofs, and ceilings for suitable conditions where emergency lighting luminaires will be installed.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Comply with NECA 1.

B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.

C. Install lamps in each luminaire.

D. Supports:

1. Sized and rated for luminaire and emergency power unit weight.
2. Able to maintain luminaire position when testing emergency power unit.
3. Provide support for luminaire and emergency power unit without causing deflection of ceiling or wall.
4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire and emergency power unit weight and vertical force of 400 percent of luminaire weight.

E. Wall-Mounted Luminaire Support:

1. Attached to structural members in walls.
2. Do not attach luminaires directly to gypsum board.

F. Suspended Luminaire Support:

1. Pendants and Rods: Where longer than 48 inches (1200 mm), brace to limit swinging.
2. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.
3. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of luminaire chassis, including one at each end.
4. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.

G. Ceiling Grid Mounted Luminaires:

1. Secure to any required outlet box.
2. Secure emergency power unit using approved fasteners in a minimum of four locations, spaced near corners of emergency power unit.
3. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.

3.03 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.04 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:
   1. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.
B. Luminaire will be considered defective if it does not pass operation tests and inspections.
C. Prepare test and inspection reports.

3.05 STARTUP SERVICE

A. Perform startup service:
   1. Charge batteries minimum of 24 hours and conduct one-hour discharge test.

3.06 ADJUSTING

A. Adjustments: Within 12 months of date of Substantial Completion, provide on-site visit to do the following:
   1. Inspect all luminaires. Replace lamps, batteries, signs, or luminaires that are defective.
      a. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
   2. Conduct short-duration tests on all emergency lighting.

END OF SECTION

SECTION 26 5619

LED EXTERIOR LIGHTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:
   1. Luminaire-mounted photoelectric relays.
   2. Materials.
   3. Finishes.
   4. Luminaire support components.

B. Related Requirements:
   1. Section 260923 "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.

1.03 DEFINITIONS

A. CCT: Correlated color temperature.

B. CRI: Color rendering index.

C. Fixture: See "Luminaire."

D. IP: International Protection or Ingress Protection Rating.

E. Lumen: Measured output of lamp and luminaire, or both.

F. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of luminaire.
   1. Arrange in order of luminaire designation.
   2. Include data on features, accessories, and finishes.
   3. Include physical description and dimensions of luminaire.
   4. Lamps, include life, output (lumens, CCT, and CRI), and energy-efficiency data.
   5. Photometric data and adjustment factors based on laboratory tests, complying with IES Lighting Measurements Testing and Calculation Guides, of each luminaire type. The

adjustment factors shall be for lamps and accessories identical to those indicated for the luminaire as applied in this Project.

a. Manufacturer's Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the NVLAP for Energy Efficient Lighting Products.

6. Wiring diagrams for power, control, and signal wiring.
7. Photoelectric relays.
8. Means of attaching luminaires to supports and indication that the attachment is suitable for components involved.

B. Product Schedule: For luminaires and lamps. Use same designations indicated on Drawings.

C. Delegated-Design Submittal: For luminaire supports.

1. Include design calculations for luminaire supports.

1.05 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing laboratory providing photometric data for luminaires.

B. Product Certificates: For each type of the following:

1. Luminaire.
2. Photoelectric relay.

C. Source quality-control reports.

D. Sample warranty.

1.06 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For luminaires and photoelectric relays to include in operation and maintenance manuals.

1. Provide a list of all lamp types used on Project. Use ANSI and manufacturers' codes.
2. Provide a list of all photoelectric relay types used on Project; use manufacturers' codes.

1.07 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications:

1. Luminaire manufacturers' laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.

B. Provide luminaires from a single manufacturer for each luminaire type.

C. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering prior to shipping.

1.09 FIELD CONDITIONS

A. Verify existing and proposed utility structures prior to the start of work associated with luminaire installation.

B. Mark locations of exterior luminaires for approval by Architect prior to the start of luminaire installation.

1.10 WARRANTY

A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures, including luminaire support components.

b. Faulty operation of luminaires and accessories.

c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

2. Warranty Period: 2 year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 LUMINAIRE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. UL Compliance: Comply with UL 1598 and listed for wet location.

C. L70 lamp life of 35,000 hours.

D. Lamps dimmable from 100 percent to 0 percent of maximum light output.

E. Internal driver.

F. Lamp Rating: Lamp marked for outdoor use.

G. Source Limitations:

1. Obtain luminaires from single source from a single manufacturer.

2. For luminaires, obtain each color, grade, finish, type, and variety of luminaire from single source with resources to provide products of consistent quality in appearance and physical properties.

2.02 LUMINAIRE-MOUNTED PHOTOELECTRIC RELAYS

A. <Double click here to find, evaluate, and insert list of manufacturers and products.>

B. Comply with UL 773 or UL 773A.

C. Contact Relays: Factory mounted, single throw, designed to fail in the on position, and factory set to turn light unit on at 1.5 to 3 fc (16 to 32 lx) and off at 4.5 to 10 fc (48 to 108 lx) with 15-

second minimum time delay. Relay shall have directional lens in front of photocell to prevent artificial light sources from causing false turnoff.

1. Relay with locking-type receptacle shall comply with ANSI C136.10.
2. Adjustable window slide for adjusting on-off set points.

2.03 MATERIALS

A. Metal Parts: Free of burrs and sharp corners and edges.

B. Sheet Metal Components: Corrosion-resistant aluminum. Form and support to prevent warping and sagging.

C. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position. Doors shall be removable for cleaning or replacing lenses.

D. Diffusers and Globes:

1. Acrylic Diffusers: 100 percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
2. Glass: Annealed crystal glass unless otherwise indicated.
3. Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless otherwise indicated.

E. Lens and Refractor Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.

F. Reflecting surfaces shall have minimum reflectance as follows unless otherwise indicated:

1. White Surfaces: 85 percent.
2. Specular Surfaces: 83 percent.
3. Diffusing Specular Surfaces: 75 percent.

G. Housings:

1. Rigidly formed, weather- and light-tight enclosure that will not warp, sag, or deform in use.
2. Provide filter/breather for enclosed luminaires.

H. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Labels shall be located where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.

1. Label shall include the following lamp characteristics:
   a. "USE ONLY" and include specific lamp type.
   b. Lamp diameter, shape, size, wattage and coating.
   c. CCT and CRI for all luminaires.

2.04 FINISHES

A. Variations in Finishes: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

B. Luminaire Finish: Manufacturer's standard paint applied to factory-assembled and -tested luminaire before shipping. Where indicated, match finish process and color of pole or support materials.

2.05 LUMINAIRE SUPPORT COMPONENTS

A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for luminaire electrical conduit to verify actual locations of conduit connections before luminaire installation.

C. Examine walls, roofs, canopy ceilings and overhang ceilings for suitable conditions where luminaires will be installed.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 TEMPORARY LIGHTING

A. If approved by the Architect, use selected permanent luminaires for temporary lighting. When construction is substantially complete, clean luminaires used for temporary lighting and install new lamps.

3.03 GENERAL INSTALLATION REQUIREMENTS

A. Comply with NECA 1.

B. Use fastening methods and materials selected to resist seismic forces defined for the application and approved by manufacturer.

C. Install lamps in each luminaire.

D. Fasten luminaire to structural support.

E. Supports:

1. Sized and rated for luminaire weight.
2. Able to maintain luminaire position after cleaning and relamping.
3. Support luminaires without causing deflection of finished surface.

4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.

F. Wall-Mounted Luminaire Support:

1. Attached to structural members in walls.

G. Wiring Method: Install cables in raceways. Conceal raceways and cables.

H. Coordinate layout and installation of luminaires with other construction.

I. Adjust luminaires that require field adjustment or aiming. Include adjustment of photoelectric device to prevent false operation of relay by artificial light sources, favoring a north orientation.

J. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" and Section 260533 "Raceways and Boxes for Electrical Systems" for wiring connections and wiring methods.

3.04 INSTALLATION OF BOLLARD LUMINAIRES

A. Align units for optimum directional alignment of light distribution.

1. Install on concrete base with top 4 inches (100 mm) above finished grade or surface at luminaire location. Cast conduit into base, and shape base to match shape of bollard base. Finish by troweling and rubbing smooth. Concrete materials, installation, and finishing are specified in Section 033000 "Cast-in-Place Concrete."

3.05 CORROSION PREVENTION

A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.

B. Steel Conduits: Comply with Section 260533 "Raceways and Boxes for Electrical Systems." In concrete foundations, wrap conduit with 0.010-inch- (0.254-mm-) thick, pipe-wrapping plastic tape applied with a 50 percent overlap.

3.06 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.07 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.

2. Verify operation of photoelectric controls.

B. Illumination Tests:

1. Measure light intensities at night. Use photometers with calibration referenced to NIST standards. Comply with the following IES testing guide(s):
    a. IES LM-5.
    b. IES LM-50.
    c. IES LM-52.
    d. IES LM-64.
    e. IES LM-72.

C. Luminaire will be considered defective if it does not pass tests and inspections.

D. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

3.08 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain luminaires and photocell relays.

3.09 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting the direction of aim of luminaires to suit occupied conditions. Make up to two visits to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.
    1. During adjustment visits, inspect all luminaires. Replace lamps or luminaires that are defective.
    2. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
    3. Adjust the aim of luminaires in the presence of the Architect.

END OF SECTION

SECTION 26 0526

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes methods and materials for grounding systems and equipment.

1.02 SUBMITTALS

A. Field quality-control test reports.

PART 2 - PRODUCTS

2.01 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.
4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, and 1/4 inch in diameter.
5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
6. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

C. Grounding Bus: Rectangular bars of annealed copper, 1/4 by 2 inches in cross section, unless otherwise indicated; with insulators.

2.02 CONNECTORS

A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.

1. Pipe Connectors: Clamp type, sized for pipe.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.03 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad, sectional type; 3/4 inch in diameter by 10 feet in length.

PART 3 - EXECUTION

3.01 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger, unless otherwise indicated.

B. Underground Grounding Conductors: Install bare copper conductor, No. 2/0 AWG minimum.

1. Bury at least 24 inches below grade.

C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

D. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.

1. Install bus on insulated spacers 1 inch, minimum, from wall 6 inches above finished floor, unless otherwise indicated.
2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, down to specified height above floor, and connect to horizontal bus.

E. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Structural Steel: Welded connectors.

3.02 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

A. Comply with IEEE C2 grounding requirements.

B. Grounding Manholes and Handholes: Install a driven ground rod through manhole or handhole floor, close to wall, and set rod depth so 4 inches will extend above finished floor. If necessary, install ground rod before manhole is placed and provide No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inches above to 6 inches below concrete. Seal floor opening with waterproof, non-shrink grout.

C. Grounding Connections to Manhole Components: Bond exposed-metal parts such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper bonding conductor. Train conductors' level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields as recommended by manufacturer of splicing and termination kits.

3.03 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

C. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.

D. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.

E. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.

F. Signal and Communication Equipment: For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.

1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch (6-by-50-by-300-mm) grounding bus.
2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

3.04 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Ground Rods: Drive rods until tops are 2 inches (50 mm) below finished floor or final grade, unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating, if any.

C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.

D. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service

pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.

2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

E. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet (18 m) apart.

3.05 FIELD QUALITY CONTROL

A. Perform the following tests and inspections and prepare test reports:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at individual ground rods. Make tests at ground rods before any conductors are connected.

    a. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
    b. Perform tests by fall-of-potential method according to IEEE 81.

B. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity 500 kVA and Less: 10 ohms.
2. Power Distribution Units or Panelboards Serving Electronic Equipment: 3 ohm(s).
3. Manhole Grounds: 10 ohms.

C. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION

SECTION 26 0529

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes the following:

1. Hangers and supports for electrical equipment and systems.

1.02 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. IMC: Intermediate metal conduit.

C. RMC: Rigid metal conduit.

1.03 PERFORMANCE REQUIREMENTS

A. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

PART 2 - PRODUCTS

2.01 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Allied Tube & Conduit.
b. Cooper B-Line, Inc.; a division of Cooper Industries.
c. ERICO International Corporation.
d. GS Metals Corp.
e. Thomas & Betts Corporation.
f. Unistrut; Tyco International, Ltd.
g. Wesanco, Inc.

2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-
3. Channel Dimensions: Selected for applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1) Cooper B-Line, Inc.; a division of Cooper Industries.
2) Empire Tool and Manufacturing Co., Inc.
3) Hilti Inc.
4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
5) MKT Fastening, LLC.

2. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
3. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.

4. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
5. Toggle Bolts: All-steel springhead type.
6. Hanger Rods: Threaded steel.

2.02 SEISMIC SUPPORTS AND RESTRAINTS

A. The Division 26 Contractor shall be responsible for the design and installation of seismic restraints for the anchorage of all electrical equipment and conduit systems to the main structural system. Anchorage shall be designed for lateral forces in accordance with local Standard Building Code.

PART 3 - EXECUTION

3.01 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with single-bolt conduit clamps.

3.02 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To New Concrete: Bolt to concrete inserts.
2. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
3. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.
4. To Light Steel: Sheet metal screws.
5. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.03 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

B. Field Welding: Comply with AWS D1.1/D1.1M.

3.04 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION

SECTION 28 3100

FIRE DETECTION AND ALARM

PART 1 - GENERAL

1.01 STIPULATIONS

A. General provisions of the Contract Documents including General and Supplementary Conditions and Division 1 Specifications Sections apply to all work in this section.

1.02 WORK INCLUDED

A. This Section of the specification covers the furnishing and installing of a new complete multiplex/addressable fire alarm system for the Coushatta Education Building as described herein and as shown on the drawings. The work covered by this section of the specifications includes the furnishing of all equipment, labor, materials, and performance of all operations, including field programming of the new system associated with the installation.

B. Phasing. Contractor will be required to phase the installation of the new fire alarm system in conjunction with the overall project. Provide a complete and functional system.

C. Provide Fire Alarm Control Panel (FAP), remote Fire Alarm Annunciators (FAA), alarm initiating devices, alarm indicating appliances, and all required connections as shown on the drawings. The FAP shall be UL listed for use as per Control Units (UOJZ). The detection system shall provide smoke and heat detectors, manual pull stations and duct detectors in areas indicated on the drawing. Provide audible/visible notification throughout.

D. Provide necessary equipment, miscellaneous connections, and programming required to interface the new system with the Supervising Station selected by the Owner and as allowed by the Fire Marshal.

E. Provide all interface modules necessary to interconnect the building FAP with the automatic suppression systems, HVAC fan and damper controls, automatic extinguishing systems, kitchen hood fans and associated suppression systems, electromagnetic door holders, and other required initiating or control output devices as applicable. Coordinate all locations of required interconnections with the respective trade contractors.

F. The system shall include all wiring, raceways, pull boxes, terminal cabinets, outlet and mounting boxes, control equipment, alarm and supervisory signal initiating devices, alarm notification appliances, and all other manufacturer proprietary equipment such as Signaling Line Circuit (SLC) modules, notification appliance circuit modules, and other accessories and miscellaneous items required for a complete operating system in the building.

G. The layout on the drawings is diagrammatic. A single fire alarm control panel, a Remote Fire Alarm Annunciator, and several Notification Appliance Circuit (NAC) extender panels (auxiliary power supplies) are indicated. Where additional remote fire alarm control units, NAC extender panels, or similar fire alarm related equipment are needed, they shall be provided at a suitable terminal cabinet location. Each remote fire alarm control unit shall be powered from a wiring riser specifically for that use or from a local power panel. All fire alarm power circuits shall be dedicated. Where remote fire

control units are provided, equipment for notification appliances may be located in the remote fire alarm control units.

1.03 DEFINITIONS

A. Wherever mentioned in this specification or on the drawings, the nomenclature, equipment, devices, appliances, and functions shall be as defined by NFPA 72 or as follows:

1. Authority Having Jurisdiction (AHJ) – For the purpose of these documents the term AHJ is defined as are other commonly used terms for personnel associated with review or approval as follows:

a. AHJ - The Coushatta Tribe of Louisiana

b. Fire Marshal - Coushatta Tribal Fire Department

c. Owner - The Coushatta Tribe of Louisiana

d. Professional – Windward Engineers & Consultants, LLC

e. Construction Manager (CM) – Agent for the Owner that oversees or coordinates the project daily.

f. Insurance Carrier – Agent for the Owner that provides insurance coverage for the project.

2. Terminal Cabinet – A steel cabinet with locking, hinge-mounted door in which terminal strips are securely mounted. Minimum size is 8-inches by 8-inches (200 mm by 200 mm).

3. Furnish – To supply the stated equipment or materials.

4. Install – To set in position and connect or adjust for use.

5. Provide – To furnish and install the stated equipment or materials.

6. Contractor – Shall refer to the Fire Alarm/Electrical Contractor.

7. Fire Protection/Sprinkler Contractor – Shall refer to the person or groups responsible for providing the sprinkler system.

1.04 APPROVALS

A. The Contractor must comply with all laws, ordinances, and regulations of all Authorities Having Jurisdiction (AHJ), including Borough, County, State, Federal, Public Utility, and the Owner’s insurance carrier.

B. Battery calculations, product data sheets, shop drawings and all other associated submittals must bear the stamps of and be reviewed and/or approved by the AHJ and the Owner’s insurance carrier. Any and all comments received from the aforementioned reviews, and resolution thereof, shall be submitted to the Professional for record.

C. The Contractor shall submit full and complete shop drawings to the Professional for review and obtain a stamp of approval from the Professional prior to installation.

1.05 FIRE ALARM DESIGN

A. System shall be a complete, supervised, non-coded, addressable fire alarm system conforming to NFPA 72. The system shall operate in accordance with the Matrix of Operations shown on the Contract Drawings. The system shall remain in the alarm mode until all initiating devices are reset and the FAP is manually reset and restored to normal status. The system shall provide the following functions and operating features:

1. All fire alarm system circuits shall be electrically supervised. Provide Class B Signaling Line Circuits (SLC) and Class B Notification Appliance Circuits (NAC). Provide supervision of the primary power supply, presence of the battery, battery voltage, and placement of the modules within the panel.

2. Automatic response functions shall be accomplished by the first device initiated. Alarm functions resulting from initiation by the first devices shall not be altered by subsequent alarms.

3. Alarm, supervisory and trouble signals shall be automatically transmitted to the approved Supervisory Service via a dual-path communicator capable of transmitting signals via internet protocol (IP) and/or cellular signal. Provide all power and data connections needed to produce a functioning system.

4. History log function shall be enabled and shall include all alarms, trouble signals, and reset activities/events. The history log shall not be erased during complete loss of power.

5. The Environmental Compensation function shall be enabled.

6. Adjustable sensitivity for detectors.

7. Block Alarm and Acknowledge shall be provided.

8. The trouble signals shall be non-latching.

9. Alarm Verification shall be available.

10. Device Confirmation shall be enabled.

11. All function keys shall be programmed in accordance with the AHJ and Owner’s specific requirements.

12. Provide program capability via switches in a locked portion of the FAP to bypass the automatic notification appliance circuits, , kitchen shunt mechanisms, air handler shutdown, supervising station and other output features. Operation of this programming shall indicate a trouble condition on the FAP and printer output.

13. Alarm functions shall override trouble or supervisory functions. Supervisory functions shall override trouble functions.

14. The system shall be capable of being programmed in the field. All programmed information shall be stored in non-volatile memory.

15. The system shall be capable of operating, supervising, and/or monitoring both addressable and non-addressable alarm and supervisory devices.

16. There shall be no limit, other than maximum system capacity, as to the number of addressable devices which may be in alarm simultaneously.

17. The system shall be configured to permit a single person walk-test to be performed.

18. All automatic sprinkler devices, including control valves and water flow switches, as indicated on the drawings, shall be monitored in accordance with the Matrix of Operations.

B. Detection Initiation

1. Alarm Verification – Feature shall be field programmable for all smoke detectors in accordance with NFPA 72. Cross-zoning shall not be permitted as a substitute for alarm verification.

2. Detector Sensitivity Check/Adjustment – Individual smoke detector sensitivity checking and adjusting for alarm condition shall be provided at the FAP. Said sensitivity checking and adjusting shall meet and be listed by UL for this function.

3. Detector Maintenance Monitoring – Provide monitoring of smoke detector chambers for gradual buildup of foreign materials in the sensing chamber. When the smoke detector senses a high level of contamination, the control panel shall cause a trouble condition and indicate the specific detector location in need of maintenance.

4. Automatic Drift Compensation – All smoke detectors shall be monitored for changes in sensitivity ranges and automatically adjust the detection range up or down to compensate for environmental changes or degradation of detector components.

1.06 OVERVOLTAGE AND SURGE PROTECTION

A. Signaling Line Circuit Surge Protection. All communications equipment shall be protected against surges induced on any SLC. All cables and conductors, which serve as communications links, shall have surge protection circuits installed in accordance with the Manufacturer's recommendations.

B. Power Supply Circuit Protection. The 120 VAC power supply for the FAP shall be protected against surges in accordance with the Manufacturer's recommendations.

C. Fuses shall not be used for surge protection.

D. Wiring extending outside the building, either underground or overhead, shall meet the requirements of the NEC, NFPA 72, and the manufacturer with respect to lightning and other induced surges. Provide low voltage line protection at the wire entry point to the building.

1.07 QUALITY ASSURANCE

A. Contractor:

1. "Contractor" is defined as the company and authorized representative thereto that installs the fire alarm equipment.

2. Installation shall be accomplished by a Contractor with a minimum of five (5) years experience in the installation of fire alarm systems. Contractor shall show evidence of certification of at least 1 employee directly responsible for the work by the National Institute for Certification in Engineering Technologies (NICET) at Level II, III, or IV in the Fire Alarm Systems subfield of Fire Protection Engineering Technology; or, a Registered Engineer with similar experience in Fire Alarm System installation.

3. If such a certified individual is not employed, adequate documentation shall be provided to show comparable training and experience of an existing employee. At a minimum, comparable

training and experience shall consist of 5 years of progressive experience in the installation and design of fire alarm systems of similar size and complexity to that specified herein. Any proposed installer who cannot show evidence of such qualifications may be rejected. The services of a technician certified by the control equipment manufacturer shall be provided to supervise installation adjustments and tests of the system.

B. Distributor:

1. "Distributor" is defined as the company and authorized representative of the Manufacturer that distributes and designs the fire alarm system and associated equipment provided by the Manufacturer and installed by the Contractor.

2. The Distributor shall show evidence of certification by the Manufacturer in the technical support of the system installed under this contract. Documentation of factory Manufacturer training on the system and products being provided is required for an individual directly associated with the project.

3. The Distributor shall show evidence of certification of at least 1 employee by the National Institute for Certification in Engineering Technologies (NICET) at Level III or IV in the Fire Alarm Systems subfield of Fire Protection Engineering Technology; or, a Registered Engineer with similar experience in Fire Alarm System design and installation.

4. If such a certified individual is not employed, adequate documentation shall be provided to show comparable training and experience of an existing employee. At a minimum, comparable training and experience shall consist of 5 years of progressive experience in the installation and design of fire alarm systems of similar size and complexity to that specified herein and demonstrate experience with the design and installation of the system being provided. Additionally, provide documentation for the registered PE or NICET level person that will review and certify the design.

C. Manufacturer and Equipment:

1. "Manufacturer" is defined as the company and authorized representative thereto that produces the fire alarm equipment.

2. Each item of the Fire Alarm System shall be listed as a product of a single fire alarm system manufacturer under the appropriate category by Underwriters Laboratories, Inc. (UL), and shall bear the UL label. All control equipment is to be listed under UL category UOJZ as a single control unit. Partial listing shall NOT be acceptable.

3. All devices shall be listed for use with the UOJZ listed control panel. Any associated third party equipment that is not required to be specifically listed for use with the control panel, shall be certified as being acceptable for use with the specified system by the Manufacturer.

4. Testing Services or Laboratories:

a. Provide fire alarm and detection system components that are UL listed and FM approved and labeled for their intended use and service. Construct all fire alarm and fire detection equipment in accordance with the latest edition of publications from Underwriters Laboratories (UL) and Factory Mutual Engineering Corporation (FM) such as:

1) UL 464 – Audible Signal Appliances

2) UL 864 – Control Units for Fire Protective Signaling Systems

3) UL 1971 – Signaling Devices for the Hearing Impaired

D. Codes and Standards:

1. The 2021 Louisiana State Uniform Construction Code
2. Any Tribal Amendments or Ordinances.
3. National Fire Protection Association (NFPA) (IBC/IFC referenced edition if so designated, otherwise latest edition):
   a. NFPA 70, National Electrical Code (NEC)
   b. NFPA 72, National Fire Alarm Code
   c. NFPA 101, Life Safety Code,
4. Americans with Disabilities Act (ADA) and the Americans with Disabilities Act Accessibility Guidelines (ADAAG).
5. Underwriters Laboratories (UL), Current Edition or Verified Supplements.
   a. Fire Protection Equipment Directory
   b. Electrical Construction Materials Directory
6. Factory Mutual (FM) Approval Guide, Current Edition or Verified Supplements.
7. The Owner's Insurance Carrier.

1.08 SUBMITTALS

A. Refer to any front end general project or electrical specifications for basic information relating to submittal requirements.

B. The Fire Alarm/Electrical Contractor is responsible for all fees and efforts associated with the required approvals.

C. Prior to installation of any materials and/or system components, all fire alarm system shop drawings and equipment must be approved by and bear the stamp of the AHJ and the Owner's Insurance Carrier as applicable. Provide shop drawings as specified in IBC 907.1.2 to the AHJ. Any and all comments received from these reviews shall be submitted to the Professional. After approval by the aforementioned agencies and review by the Design Professional, submit 1 complete record set of documents bearing the aforementioned agencies approval to the Owner and another to the Professional.

D. Submit all shop drawings to the Design Professional for review and approval. Submittals are to be complete. Partial submittals shall not be accepted except as follows. Include in the first submittal a schedule indicating the packaging and estimated delivery date of all required submittals. Example: Submittal 1 (date) will include: Contractor Qualifications, Phasing Plan, and Catalog Data . Submittal 2 (date) will include: AHJ approvals and Drawings and Calculations. Submittal 3 (date) will include: System Messages, Test Plan and Extended Service Agreement.

E. The submittal shall be made as a complete package consisting of fire alarm equipment ONLY. The submittal shall NOT include other electrical equipment or components not directly related to the fire

alarm system installation (e.g., security, sound systems, power, etc.) for approval. Where other equipment or components are an integral part of the fire alarm system, they shall be indicated as such but not included with the submittal and only show required interface details. Failure to submit all required materials as a complete, separate, single package shall be cause for rejection of entire package. Copies of the Contract Documents with contractor's notes thereon will be rejected. Simply redlining the Contract Documents is not acceptable. For any resubmittals to the Professional, provide a written response to any previous comments.

F. The fire alarm equipment distributor shall submit documents as specified in the Qualifications portion of this Section. The submittal shall include identification of the following:

1. Name, title, address, and proof of qualifications for each "Contractor" and authorized representative, "Distributor" and authorized representative, and "Manufacturer" and authorized representative.

2. When the distributor intends to utilize the services of a manufactured-affiliated company in the system design, the distributor shall submit a letter of intent to do so, addressed to the Professional, which includes the name of the manufacturer-affiliated company, the names and qualifications of the NICET-certified or registered Engineer employees of the company, and which describes the delegation of fire alarm system design responsibilities.

G. Provide a narrative description of the phasing plan.

1. Provide updates to the Professional on a monthly basis including projected dates.

H. System Component Data, Shop Drawings, and Calculations:

1. Drawings shall be to scale. Submit 24x36 or 30x42 inch shop drawings at a scale not smaller than 1/8 inch = 1 foot. All drawings to be in CAD. System component data and calculations shall not be smaller than letter size.

2. Symbols shall be consistent for the entire shop drawing package. Therefore, the symbols used on the floor plan drawings shall be the same symbols used on the riser diagram and details. Submitting a riser diagram with a copy of the Contract Drawings used as the floor plans is unacceptable and will result in rejection of the shop drawings.

3. As a minimum, the fire alarm and fire detection shop drawing submittal shall include the following:

a. Include annotated catalog data showing manufacturer's name, model, voltage, and catalog numbers for all equipment and components. Where multiple configurations of equipment or options are available, indicate specific configuration being submitted.

b. Provide floor plans showing the location of all control units, power extenders, devices, equipment, and appliances and their addresses; including identification of equipment controlled or monitored by the fire alarm system (e.g., fans, dampers, etc.). Show circuiting between all devices. Show locations for all junction boxes used for T-taps. Indicate conduit fill percentages on the plans.

c. Provide complete riser diagrams indicating the wiring sequence of all devices, equipment, and appliances, their addresses, and their connections to the control equipment. Provide a color code schedule for the wiring.

d. Provide point-to-point wiring diagrams showing the points of connection and terminals used for all electrical field connections in the system, including all interconnections within fire alarm cabinets, and between the equipment or systems which are supervised or controlled by the fire alarm system. Diagrams shall show all connections from field devices (interface modules, all fire protection equipment, detectors, manual pull stations, notification appliances, etc.) to the FAP and remote FAA, initiating circuits, switches, relays and terminals, and other ancillary equipment.

e. Provide wiring diagrams and drawings to depict the layout of the power supplies and corresponding audible/visible circuits. Provide circuit numbers for each NAC and SLC circuit.

f. Provide drawings and a description of how the fire alarm system meets the requirements to synchronize all the notification appliances throughout the building.

g. Provide data on each circuit to indicate that there is at least 20 percent spare capacity for notification appliances on the NAC, and 20 percent spare capacity for initiating devices on the SLC (e.g., not more than 80 percent loaded). This portion of the submittal shall include wire sizing calculations to show that the wiring lengths and wire gauge provide adequate voltage to the last device on a circuit. Example - An 8 amp power supply would not be loaded to more than 6.4 amps and if the audible/visible appliance is rated for 20 to 24 volts DC, the wire sizing calculations would show that the last device has a minimum voltage of 20.8 volts. The calculation shall be provided in a tabular format. Simply providing the amperage at the end of the circuit on the riser or plan drawings is not acceptable.

h. Provide complete battery calculations for both the alarm and supervisory power requirements. The calculation shall include: identification, quantity, and ampere-hour requirements for each system component and/or device in both the standby and alarm conditions in a tabular or other easily discernible format. In addition to any manufacturer's recommended derating factor, provide an overall minimum 20 percent Safety Factor.

i. Provide a complete description of the system operation. This shall be a written summary or detailed expansion of the Matrix of Operations shown on the contract drawings.

j. Provide mounting details for all panels. Provide typical mounting details for each type of device for each unique mounting application (e.g., ACT or gypsum ceiling, steel beams or trusses, block or gypsum walls).

k. Include submittal data for all wire, terminal cabinets, and raceways. Provide color samples as required.

l. Provide a complete list of device addresses and their corresponding message to be displayed on the FAP and remote FAA. The wording of the system messages as they appear at the FAP and remote FAA panels shall be submitted for approval to the Owner and the Professional.

I. Provide a complete test plan for system testing at least three weeks prior to the Final acceptance test.

J. Submit a copy of the extended service agreement.

K. Upon receipt of final-approved shop drawing review, the contractor shall issue one set to the local Code Official.

1.09 PROJECT RECORD DOCUMENTS

A. Prepare and submit 5 sets of detailed CAD "As-Built" drawings. The drawings shall show the system as installed, including all deviations from both the project drawings and the approved shop drawings. The drawings shall be prepared on uniform sized sheets the same size as the project drawings.

B. The drawings shall include complete plan view wiring diagrams showing connections between all devices and equipment, including, but not limited to, fire alarm panels, field devices and single line circuit routings between devices. Indicate conduit fill percentages on the plans. All equipment in panels shall be shown in the as-built orientation.

C. Provide drawings detailing all wiring connections within the FAP.

D. Include a riser diagram and drawings showing the as-built location and address or circuit number of all devices and equipment.

E. These drawings shall be submitted with the specified operations and maintenance manuals.

F. Upon completion of the project and after approval by the design Professional, submit one (1) complete, reproducible record set to the Owner. A single CAD (electronic) copy of the "As-Built" drawings shall also be provided.

G. All drawings submitted shall be signed and sealed by the Registered Engineer or the NICET employee of the distributor.

H. Ensure all required record documents are placed in the document storage box at the fire alarm control panel in accordance with NFPA 72.

1.10 OPERATION AND MAINTENANCE DATA

A. Provide 5 bound copies of an operation and maintenance manual. Maintenance manuals shall be furnished complete and consist of fire alarm equipment and data only. Each shall contain sufficient detailed information to enable Owner's technicians to understand, operate and maintain the system equipment and to identify replaceable parts. The manual shall include:

1. An index.

2. Copies of ALL APPROVED SHOP DRAWINGS AND SUBMITTAL MATERIALS UPDATED TO "AS-BUILT".

3. A complete parts list of all components.

4. A copy of the completed and signed Testing and Inspection Form (from NFPA 72 or equivalent).

5. Operating instructions, maintenance and repair procedures, and troubleshooting guidelines.

6. Testing procedures and maintenance frequencies.

7. A list of recommended spare parts. The spare parts list shall include, for each item, the manufacturer's name, serial number of the part, an ordering number, if appropriate, and a physical and electrical description of the part.

8. A printout of the new system program, including all input and output addresses and messages displayed at the FAP and FAA. Failure to include the system program will be cause for withholding final payment.

9. A written copy of all passwords or other access codes for the FAP.

1.11 SERVICE AGREEMENT

A. Included in the bid price shall be a 1 year service contract, effective upon final system acceptance, to provide all service required beyond the warranty and the capability of the facility personnel. Contract shall include all service and repairs required under the warranty as well as quarterly, semi-annual, and annual system testing and inspection in accordance with NFPA 72.

B. The distributor shall make available to the Owner a testing and maintenance contract proposal to maintain the system in accordance with NFPA 72 for years 2 through 5. Breakout pricing on a per year basis. Owner is under no obligation to accept.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Edwards Systems Technology

B. Honeywell

C. Notifier

D. Siemens

E. Approved Equal

2.02 FIRE ALARM CONTROL PANEL (FAP)

A. Provide a complete control panel fully enclosed in a lockable steel enclosure as specified herein. All operations required for testing or for normal care and maintenance of the systems shall be performed from the front of the enclosure. If more than a single unit is required at a public accessible location to form a complete control panel, the unit enclosures shall match exactly.

B. Each control unit shall provide power, supervision, control and logic for the entire system, utilizing solid state, modular components, internally mounted and arranged for easy access. Each control unit shall be suitable for operation on a 120 volt, 60 hertz, building power supply. The system devices shall operate at 24 volts DC. Provide each panel with supervisory functions for power failure, internal component placement, and operation. Visual indication of alarm, supervisory or trouble initiation on the fire alarm control panel shall be by liquid crystal display or similar means with a minimum of 80 characters of which at least 32 are field changeable.

C. The FAP shall be listed for Remote Station Service. Provide audible signals to indicate any alarm or trouble condition. The alarm signals shall be different from the trouble signal. Connect all circuit conductors entering or leaving the panel to screw-type terminals with each terminal marked for identification. Locate diodes and relays, if any, on screw terminals in the FAP. Circuits operating at 24 VDC shall not operate at less than 20.8 volts. Circuits operating at any other voltage shall not have a voltage drop exceeding 10 percent of nominal voltage.

D. Operation of the system shall be in accordance with the description under “SYSTEM OPERATION” of this specification section and as indicated in the Matrix of Operations shown on the Contract Drawings.

E. The cabinet enclosure shall be identified by permanent markings on the cabinet or by an engraved laminated phenolic resin nameplate. Lettering on the nameplate shall identify the cabinet and shall not be less than 1-inch high. Provide prominent rigid plastic or metal identification plates for all lamps, circuits, meters, fuses and switches. The cabinet shall be provided in a sturdy steel housing, complete with backbox, hinged steel door with cylinder lock, and surface mounting provisions.

F. Provide trouble and supervisory silencing switch that will silence the audible trouble and supervisory signal, but not extinguish the visual indicator at the FAP and FAA. These switches shall be overridden upon activation of a subsequent alarm.

G. Provide a drill test switch which will activate the alarm indicating devices, but will not put the panel into the alarm mode and will not notify the Supervising Station.

H. Power and supervise each circuit such that a signal from a single device does not prevent the receipt of signals from any other device. All circuits shall be manually resettable by switch from the FAP after the initiating device or devices have been restored to normal.

I. The fire alarm system shall activate general building alarm utilizing the “Temporal Tone”.

J. Provide each control unit with non-volatile memory and logic for all functions. The use of long life batteries, capacitors or other age-dependent devices shall not be considered as equal to non-volatile processors, PROMS or EPROMS.

K. Provide control units and control panels that are fully field programmable for control, initiating, supervisory and trouble functions of both input and output. The system program configuration shall be menu-driven. All system changes shall be password protected and shall be accomplished using personal computer based equipment. All system changes shall be in non-volatile memory.

L. The FAP shall contain features which allow the bypassing of input devices from the system or the modification of system outputs. These control features shall be accessible from a panel mounted keypad. Any bypass or modification to the system shall indicate a trouble condition on the FAP and a printed output of the trouble condition.

M. Provide the necessary controls to prevent the resetting of any alarm, supervisory, or trouble signal while the alarm, supervisory or trouble condition on the system still exists.

N. Provide a typeset printed or typewritten instruction card mounted behind a Lexan plastic or glass cover in a stainless steel or aluminum frame. Install the frame in a conspicuous location observable from the FAP. The card shall show those steps to be taken by an operator when a signal is received as well as the functional operation of the system under all conditions, normal, alarm, supervisory and trouble. The instructions shall be approved by the Owner and the Professional before being posted.

O. The FAP shall have a walk test feature. When using this feature, operation of initiating devices shall result in limited system outputs, so that the notification appliances operate for only a few seconds and the event is indicated on the system printer, but no other outputs occur.

P. Secondary source for emergency power to the FAP:

1. Provide a battery powered secondary power system with sufficient capacity to operate the complete alarm system in normal or supervisory (non-alarm) mode for a period of 24 hours.

Following this period of normal operation, the batteries shall have sufficient capacity to operate the system during a fire or other emergency condition for a period of 5 minutes.

2. The battery secondary power source shall be sealed lead-acid or nickel cadmium batteries. Provide an automatic transfer switch to transfer the load to the batteries in the event of the failure of primary power.

3. Provide a solid state, fully automatic, variable charging rate battery charger. The charger shall be capable of providing 150 percent of the connected system load and shall maintain the batteries at full charge. In the event the batteries are fully discharged, the charger shall recharge them back to full charge in twelve hours.

Q. The loss of primary power at the FAP shall result in a trouble signal at both the FAP and the FAA.

2.03 SYSTEM PRINTER

A. Stand Alone Printer Capability: Provide capability and components within the fire alarm panel to connect a stand-alone printer for service and maintenance needs. The printer shall be capable of being utilized for maintenance or system troubleshooting as well as recording alarms.

2.04 COMMUNICATOR

A. Provide a communicator compatible with the Owner's supervising station to transmit signals as specified in the Matrix of Operations.

B. The stand-alone communicator shall be UL864 listed and shall have the capability of transmitting alarms via ethernet and cellular data. The communicator shall be compatible with the owner's supervising station to transmit signals as specified in the matrix of operations.

C. Provide back-up battery, size as recommended by the manufacturer, and power transformer in a wall outlet box. Provide low-voltage power-limited cables in conduit from the power transformer to the communicator.

D. Provide data cables, cards and components to communicate with supervising station. A 3/4-inch conduit with the required two (2) cat 6 data cables shall be extended from the FAP communicator to the connection point.

E. Install the communicator in the same room and within 20 feet of the FAP.

F. Provide all power and data connections needed to produce a functioning system.

2.05 AUXILIARY POWER SUPPLIES

A. Auxiliary power supplies or notification extender panels of the same Manufacturer as the FAP, or listed for use with the FAP, shall be installed as necessary to provide power to the visible alarms and other required equipment.

2.06 REMOTE FIRE ALARM ANNUNCIATOR (FAA)

A. The Remote FAA panels shall provide the same alpha-numeric display as that of the FAP. FAA panels that provide minimal control functions such as the ability to acknowledge, silence, and reset are acceptable in lieu of those providing full control functions. Size of the panel is a consideration with smaller panels being preferred.

2.07 MONITOR AND CONTROL MODULES

A. Provide supervised addressable monitor and control modules as appropriate to interface with required devices. These devices may also require control relays depending upon the device being interfaced. This includes, but is not limited to, HVAC systems, electromagnetic door holders, sprinkler waterflow switches, tamper switches, and supervisory switches.

B. Modules shall be of the type that mount in a 4 inch square box. The use of addressable relays and mini-modules is acceptable for certain applications with the prior approval of the Professional. Any such use of addressable relays and mini-modules shall be identified in the submittals along with mounting or securing details for each application.

2.08 MANUAL PULL STATIONS

A. Provide addressable double-action type manual pull stations throughout, except as noted below. The stations shall have an impact resistant polycarbonate or cast or extruded metal cover, finished in red with molded raised letter operating instructions of contrasting color. Stations requiring the breaking of a glass panel are not acceptable.

B. Provide manual pull station with a clear plastic or wire metal cover to protect the device from damage in the gym and in areas subject to damage.

C. Furnish stations which require the use of a key or a wrench to reset. All stations shall be master keyed with the fire alarm control panel. Station switches and contacts shall be rated for the voltage and current at which they shall operate. Stations shall be supplied with screw terminals for making connections.

D. Where devices are located in an area subject to high humidity or adverse conditions (e.g., exterior, showers, etc.) indoor/outdoor, weatherproof appliances shall be provided.

2.09 SMOKE DETECTORS

A. Provide addressable photoelectric or ionization open area and photoelectric duct smoke detectors as follows:

1. Provide analog smoke detectors utilizing the photoelectric light scattering principle or ionization principal for operation. Smoke detectors shall be listed for use with the fire alarm control panel.

2. Provide self restoring type detectors which do not require any readjustment after actuation to restore it to normal operation. Detectors shall be UL listed as Smoke – Automatic Fire Detectors. Install detectors in accordance with the requirements described in the listing.

3. Detectors shall have alarm verification capability and an environmental compensation feature and provided with an insect screen.

4. Provide twist lock bases for the detectors. The detectors shall maintain contact with their bases without the use of springs. Provide companion mounting base with fixed wiring terminals. The detector shall have a visual indicator to show actuation. Detectors shall have a vandal-resistant security lock. Audible bases utilizing the temporal pattern shall be installed as shown on the drawings.

5. The detector address shall identify the particular unit, its location within the system, and its sensitivity setting. Detector shall be of the low voltage type rated for use on a 24 VDC system.

6. Detectors shall be equipped with screw terminals for each conductor.

7. Duct smoke detectors shall be furnished by the Fire Alarm Contractor and installed by the HVAC Contractor. The Fire Alarm Contractor shall coordinate sampling tube sizes with the HVAC Contractor. All duct smoke detectors located 10-feet or higher, located above finished ceilings, or otherwise hidden from view, shall be furnished with remote alarm indicator lamps and test stations located in a readily accessible location, along with identification nameplates clearly indicating the device and its location.

2.10 SINGLE OR MULTIPLE STATION SMOKE DETECTORS

A. Smoke detectors for the residential areas will be UL listed to standard 217 and suitable for operation on 120 volts, AC. Each detector will be complete with the following:

1. Built-in evacuation horn rated 85 db at 10 feet.

2. Power-on indicator.

3. Alarm indicator.

4. Tamperproof locking base.

5. Interconnection capability.

6. Color will be off white.

7. Ability to connect in tandem.

8. Operating range from 10-90% relative humidity and 40-100°F temperature.

B. Detectors will be of a design to minimize nuisance alarms from cooking odors and aerosol sprays. Each unit will be suitable for wall or ceiling mounting and will operate on the photoelectric light scatter principal.

C. Smoke detectors will be similar to BRK Electronics Model 4120B.

2.11 HEAT DETECTORS

A. All heat detectors shall be of the type that mount to twist lock bases (similar to the smoke detectors), unless the product line does not support the device specified. In that case, provide an addressable detector from the manufacturer's standard product line or a non-addressable device with the appropriate interface module. These detectors shall be equipped with screw terminals for each conductor. All detectors or twist bases shall be designed for outlet box mounting and supported independently or wiring connections.

B. Heat detectors shall be fixed temperature type where specified on the drawings. The fixed temperature shall occur at 135 degrees Fahrenheit (nominal), or as otherwise indicated on the drawings, or be provided at temperature ratings as required for maximum or ambient normal heat levels.

2.12 CARBON MONOXIDE DETECTORS

A. Provide carbon monoxide detectors meeting the requirements of UL 2075 and compatible with the installed fire alarm system.

B. Any off-normal condition (i.e. alarm or end-of-life) shall be transmitted to the main fire alarm panel as a TROUBLE alarm.

C. The detector shall be capable of being either flush or surface mounted.

D. The detector shall provide local audible indication of an alarm condition as well as provide LED status indication

2.13 NOTIFICATION APPLIANCES

A. Provide notification appliances in areas as indicated on the Contract Drawings. Combination audible/visible appliances in a single wall or ceiling mounted unit shall be used in all locations where a combination unit can be provided. Separate audible or visible appliances may be used as necessary for coverage of odd shaped areas to form a complete and functional system.

B. Wall Mounted Devices shall be flush mounted throughout the building. Surface mounted devices are permitted in mechanical rooms and like areas. All wall mounted devices shall be white unless otherwise noted.

C. Ceiling Mounted Audible, Visible, and Combination Audible/Visible shall be white unless otherwise noted.

D. Audible/visible devices in areas subject to damage shall be provided with a wire metal protective cover to protect the device from damage. Plastic covers that reduce light and sound transmission are not acceptable.

E. Audible Appliances:

1. All audible appliances shall be capable of installation on standard 4-inch (100 mm) square electrical boxes. Provide fire alarm horns conforming to UL 464, having separate terminations for each “in” and “out” connection.

2. Audible appliances shall provide a minimum output sound of 15 dBA above ambient throughout the building in accordance with NFPA 72. The appliance shall have a minimum rating of 90 dBA at 10-feet (3 m) as determined by the reverberant room test; data on peak output as determined in an anechoic chamber is not suitable. Audible appliances throughout shall emit a synchronized, temporal signal.

3. Provide notification appliance mounting plates constructed of cold rolled steel having a minimum thickness of 16 gauge and equipped with mounting holes and other openings as needed for a complete installation. All fabrication marks and holes shall be ground and finished to provide a smooth and neat appearance for each plate. Each plate shall be primed and painted red. Provide terminal blocks for making connections.

F. Visible Appliances:

1. Visible alarm indicating appliances shall be xenon strobe lights meeting the requirements of UL 1971. Strobes shall have a flash rate of between 1 and 3 HZ. Visible appliances throughout each floor shall be synchronized.

2. The strobe lens shall conform to the Americans with Disabilities Act. Strobes shall be designed and listed as required for wall or ceiling mounting as applicable.

3. The Strobe lens housing shall be red or white and engraved or stenciled with the word “FIRE”.

4. Ceiling mounted devices shall be specifically approved for ceiling mounting. Wall mounted devices shall not be used for ceiling applications unless approved for such use.

2.14 REMOTE ALARM LAMP AND TEST SWITCH

A. A remote alarm lamp shall be used for identification of an automatic device where alarm devices are mounted such that they are not visible.

B. The alarm lamp shall have an integral keyed test switch to permit testing of the initiating device remotely.

2.15 RECORD DOCUMENT STORAGE BOX

A. Provide a document storage box to hold fire alarm system records and testing information as required by NFPA 72.

B. The document storage box shall be constructed of 18 gauge cold rolled steel with a *[black][red]* factory-applied powder coat finish and white lettering reading “SYSTEM RECORD DOCUMENTS”.

C. The document storage box shall have integral capabilities to store electronic media with a minimum capacity of 8GB.

D. Acceptable manufacturers:

1. Space Age Electronics, Inc.

2. Approved equal.

PART 3 - EXECUTION

3.01 GENERAL

A. Provide and install the system in accordance with the plans and specifications, all applicable codes and the manufacturer’s recommendations. All wiring shall be installed in strict accordance with all the provisions of the NEC. Upon completion, the contractor shall so certify in writing to the Owner and the Professional.

B. All associated conduit and wiring for wall-mounted appliances shall be hidden from view. Utilize recessed back boxes to mount the fire alarm device. As an example, this would include manual pull stations and alarm notification devices attached to gypsum or CMU walls. The contractor shall receive approval from the Owner, CM or Professional prior to routing any exposed raceway in finished areas of the building. The contractor shall coordinate the routing of the conduit and placement of boxes to meet this requirement.

C. All junction boxes shall be sprayed red and labeled “Fire Alarm”. Wiring color code shall be maintained throughout the installation.

D. The contractor shall clean all dirt and debris from the inside and the outside of the fire alarm equipment after completion of the installation. Detectors shall not be installed during construction. Installing detectors with a dust cover is not acceptable. Install detectors only after the building is clean and ready for testing and occupancy.

E. The NICET approved Distributor and Contractor supervising employees shall attend all meetings required by the Professional, Owner or CM. This shall include as a minimum a project kickoff meeting, monthly job site visits to supervise the installation, and final system acceptance.

F. Use of wire nuts is prohibited. Installing multiple wires on a single terminal is prohibited.

G. Provide a smoke detector over each Fire Alarm Control Unit. For the purpose of this project, the term Fire Alarm Control Unit shall apply to the FAP, Data Gathering Panels, and Notification Extender Panels.

3.02 SYSTEM FIELD WIRING

A. Wire each signal line circuit and fire alarm indicating appliance circuit in accordance with manufacturer's instructions. Provide fire alarm circuit conductors with color coded insulation, or use color coded tape at each conductor termination and in each junction box and interface panel.

B. Size and quantity of data, communication and control wiring along with related conduit where required shall be in accordance with the General Electrical Division Specifications, except as modified herein and the manufacturer's recommendations and the referenced codes.

C. Signaling Line Circuits, Notification Appliance Circuits, and initiating device circuits shall be supervised in accordance with the requirements of NFPA 72 and the System Operation portion of this specification.

D. Provide wiring within cabinets installed parallel with or at right angles to the sides and back of the enclosure. All conductors which are terminated, spliced, or otherwise interrupted in any enclosure associated with the fire alarm system shall be connected with either crimp-on type connections or with crimp-on spade type connections to terminal blocks. Mark each terminal in accordance with the wiring diagrams of the system.

E. Junction boxes with crimp-on type connections may be utilized where two (2) or fewer wiring connections are made. Provide a labeled terminal cabinet where more than two wiring connections are made.

F. For alarm and supervisory initiating device circuits and alarm indicating circuit wiring for the low voltage portion of the fire alarm system, provide all wiring as recommended by the equipment manufacturer. Provide wiring operating at 120 VAC as minimum No. 12 AWG solid copper having similar insulation.

G. Conduit:

1. Conductors shall be run in conduit in areas with exposed ceilings and unfinished areas throughout, except as otherwise noted. This portion of the system shall be installed in a manner approved by the National Electric Code and the AHJ utilizing approved raceways.

2. All conduit shall be rigid or EMT, sized at 3/4 inch minimum. The color shall be red. Any device wiring that is concealed in a wall or other similar space shall be provided with flexible metallic conduit, conduit or other suitable raceway.

3. The use of Type MC fire alarm cable is permitted in lieu of conduit to the extent permitted by the NEC, except that conductors shall be in conduit or surface raceway as applicable in public or occupied areas with exposed ceilings. All Type MC fire alarm cable shall be red striped or otherwise identified. Type MC cable shall be similar to AFC Cable Systems Fire Alarm/Control

Cable (product indicated to show level of quality and styling). Install, support and terminate as required by the NEC and the Manufacturer's instructions.

H. Surface Raceway:

1. The building shall use exposed surface raceways as described in Section 3.1 above when it is necessary to route exposed cabling in public accessible areas. The extent to which surface raceway is permitted is based on the feasibility of first routing concealed conduit or fishing Type MC fire alarm cable to the device. Where this is not practical, surface raceway is permitted with the approval of the Owner, CM or Professional.

2. For any exposed surface raceways, metallic or non-metallic surface raceway is permissible. Non-metallic surface raceway shall be similar to Panduit LDP models (product indicated to show level of quality). All surface raceway shall be sized as required.

3. Provide new surface mounted back boxes to mount the fire alarm device in areas of the existing building where architectural work will not permit flush mounting and concealed conduit. Route new wiremold from above the ceilings, along architectural elements and down to devices where required.

4. Match or coordinate the surface raceway color with the adjoining surface to provide a uniform appearance. Paint as required and submit color samples to the Professional for approval.

I. Above Ceiling Wiring:

1. It is the intent of this Section to assure plenum rated cable installation is neat, well organized and without conflict with other components located above the ceiling area. The installation shall adhere to all the regulations set forth in the NFPA 72 and the NEC.

2. This section is an allowance for using exposed plenum rated cable and should not be constituted as a prohibition from using conduit or Type MC fire alarm cable at any location.

3. All exposed above ceiling wiring (not in conduit and not Type MC cable) shall be plenum rated cable. The cable shall be power-limited fire protective signaling circuit plenum cable, red in color, and distinctively marked, "FPLP".

4. The cables shall be run through distinct bridle rings or J hooks which are to be properly affixed to the structure, wall and/or partition at maximum 5 foot intervals. Cables shall not rest on top of the suspended ceiling assembly nor shall they be bound to the side of threaded rod or ceiling support cables nor shall they be routed within general purpose or low voltage multi-use cable trays. Cables that run through the ceiling areas may be suspended directly from the structure or deck, but shall not be attached directly to equipment, pipes or ducts.

5. Where 2 or more cables are run parallel to one another and are not within bridle rings, they shall be bound together by nylon tie straps at 5 foot intervals.

6. Plenum rated cable shall be run in conduit at all riser locations. Within areas where physical damage is anticipated, finish ceilings are not provided or when connecting to a wall mounted terminal device, conduit or Type MC fire alarm cable shall be utilized. All drops within walls shall be in a minimum of flexible metal conduit.

7. All drops to ceiling mounted devices shall be from a junction box mounted to the deck or structure. From this box, extend flexible metal conduit to the ceiling mounted device junction

box. Wiring and conduit to ceiling mounted devices shall have adequate slack to allow for removal of the device or ceiling tile as necessary. For lay-in type acoustical ceiling tiles, the ceiling mounted junction box shall be attached to via a Caddy acoustical tee bar hanger or equivalent. The box shall not be directly attached to the ceiling tile.

8. All drops to wall mounted devices shall be in flexible metal conduit where the wire is fished or installed within the wall cavity.

9. All interfaces in and out of open ends of junction boxes or conduits shall be fitted with rubber grommets to minimize the potential for damage to the conductor insulation. Specific attention shall be made to hanging methods and the use of brushings or grommets at junction box outlets, stub-ups outlets or transitions to Type MC Cable.

10. Conduit “sleeves” shall be installed where wiring passes through any wall and/or partition.

11. Cables shall be run parallel to walls and/or partitions whenever possible.

12. The contractor shall review the installation techniques with the CM and Owner prior to beginning work and review any completed work after the first day of significant work. The contractor shall remove and replace any non approved installation at his own expense.

J. In accordance with NFPA 72, connections to the light and power service shall be on dedicated branch circuits. The circuits and connections shall be mechanically protected via a handle locking or similar device. Circuit disconnecting means shall have a red marking, shall be accessible only to authorized personnel, and shall be identified as FIRE ALARM CIRCUIT CONTROL. The location of the circuit disconnecting means shall be permanently identified at each fire alarm control unit. This shall apply to all fire alarm control, NAC, amplifier, and similar panels.

K. Distinctively color code all wiring differently from the normal building wiring. Audible alarm indicating appliances shall be color coded differently from alarm initiating circuits. Use different colors for visible alarm indicating appliances.

L. Wiring connections shall be made by the Installing Contractor as shown on drawings furnished by the representative of the Distributor. Power shall not be applied to the system until the Distributor has approved the connections to the control equipment.

3.03 INSTALLATION OF FIRE ALARM INITIATING AND NOTIFICATION EQUIPMENT

A. All initiation and notification equipment shall be installed on back boxes/junction boxes. Field verify exact locations of all panels. All ceiling mounted devices in lay in ceiling areas shall utilize T-Bar hangers or approved equal. Provide a typed label on each manual pull station, detector, and interface module to indicate the loop and address number of the device.

B. Manual Pull Stations: Locate manual pull stations in areas shown on the drawings. Provide recessed back boxes in which the station operating mechanisms shall be mounted. Mount stations with the operating handles 42-inches above the finished floor.

C. Spot Type Smoke and Heat Detectors:

1. Locate detectors in areas shown on the drawings. Detectors located on the ceiling shall be installed not less than 4-inches from a side wall or to the near edge of a ceiling tile. The installation shall comply with the requirements of NFPA 72. Install smoke detectors no closer than 3 feet from HVAC registers.

2. The placement of smoke detectors provided for the closing of electromagnetic door holders shall comply with NFPA 72, except that detectors shall be placed on both sides of the door in all corridor or stairway applications. Area smoke detection may be used in lieu of additional detectors.

3. Verify the quantity and location of duct smoke detectors required with the HVAC schedules and drawings.

D. Audible/Visible Alarm Notification Appliances:

1. Locate alarm notification in areas shown on the drawings.

2. Wire audible appliances and visible appliances so they are not separately controlled as per 2007 NFPA 72.

3. As a minimum, zone each floor separately and synchronize all devices throughout the building.

E. Visible Alarm Indicating Appliances:

1. Locate visible alarm indicating appliances in areas shown on the drawings. For wall mounted strobes, the strobe shall be installed 80 inches above the finished floor or 6 inches below the ceiling, whichever is lower. Ceiling mounted devices shall be installed with the faceplate flush to the ceiling tile.

2. Provide spare capacity in circuits as described above. Strobe lights shall be wired for synchronized operation throughout.

3. Any areas that require alternate mounting locations, wall mounting heights between 80 and 96 inches, or ceiling mounted devices in lieu of wall mounted to properly cover an entire room or area based on obstruction must be coordinated with the Fire Alarm Distributor prior to submitting to the professional for approval. Adjust candela ratings and circuit calculations as required.

F. Fire Alarm Control Panel and NAC Panels:

1. Locate the FAP where indicated on the drawings. The enclosure shall be flush-mounted with top of the cabinet not more than 6 feet above the finished floor.

2. Locate NAC panels where shown on the drawings. Additional panels, when required, may be located in storage rooms, janitor's closets, or other similar not normally occupied area. The Owner must approve these locations. The enclosures shall be surface mounted with the top of the cabinet not more than 6 feet above the finished floor.

3. Provide a smoke detector over the control panels in accordance with NFPA 72.

4. Provide typed quality labels on all panel identification cards.

5. Extend power from a dedicated spare 20 Amp, 1-Phase breaker in accordance with Part 1 of this Specification and the NEC. Field verify exact locations.

G. Remote FAA:

1. Locate all remote FAA units where indicated on the drawings. The enclosure shall be flush mounted with top of the cabinet not more than 5 feet above the finished floor.

2. The final location of each FAA unit shall be field verified and located such that it is visible upon entry into the building.

3. Wiring between the FAP and the FAA shall be electrically supervised.

H. Monitor and Control Modules:

1. Modules shall be mounted within 3 feet of the device being monitored or controlled. In public accessible areas, locate in the immediate vicinity of its associated component above the ceiling.

2. Modules shall be labeled with their respective addresses.

3. The Contractor is responsible for coordinating installation with the trade Contractor's providing the other devices.

4. Sprinkler system water flow and pressure switches shall be furnished and installed by the sprinkler system contractor. Electrical contractor shall connect these switches to the fire alarm system. The Contractors shall work in a coordinated basis to test the units.

5. Sprinkler system supervisory switches shall be furnished and installed by the sprinkler system contractor. Electrical contractor shall connect the supervisory switches to the fire alarm system. The Contractors shall work in a coordinated basis to test the units.

6. The wiring between modules and their intended interface device, such as sprinkler system device, is solely the responsibility of the Fire Alarm Contractor.

7. Verify the quantity and location of electromagnetic door holders and associated fire alarm interface (smoke detectors and control modules/relays) required with the Architectural Door schedules and drawings. Electromagnetic door holders shall be failsafe (e.g., close on a loss of power to the device) and be powered by the Building Electrical System. They shall be furnished and installed by the door contractor. The Electrical Contractor shall provide power to the doors and shall connect these devices to the fire alarm system with the appropriate interface modules to release the doors on alarm. The Fire Alarm Contractor and General Contractors shall work in a coordinated basis to test the units.

8. Verify the quantity and location of HVAC units requiring unit shutdown and associated fire alarm interface (smoke detectors and control modules/relays) required with the HVAC schedules and drawings.

9. The FA Contractor shall connect to the tamper switch on the PIV and provide wire and conduit as required to complete the connection from 5 feet outside the building. The Contractor installing the underground main and PIV is to provide conduit with a pull string from the PIV to within 5' of the building.

I. The Contractor shall be responsible for coordination efforts with other construction trades working within the scope of this project.

3.04 MINIMUM SYSTEM TESTS

A. The Contractor and Distributor shall complete preliminary system testing prior to the Final testing to ensure that all systems are working properly.

B. The Contractor and Distributor shall develop a written testing plan and matrix to cover all aspects of system testing. As a minimum, this matrix should include areas for checking all devices and outputs.

Output checking shall include representative samples of input devices from circuits or multiple circuits that contribute to multiple alarm outputs.

C. Notify the AHJ, Fire Marshal, Owner's Representative, CM, and the Professional in writing a minimum of 3 weeks prior to the Final acceptance test.

D. The completed fire alarm system shall be fully tested in accordance with the provisions of NFPA 72 by the contractor in the presence of the Professional, AHJ, Fire Marshal and the Owner. The Contractor and Distributor shall perform said tests as required by the Fire Marshal inspection personnel for the final test of equipment and operation of the system. An authorized representative from each supplier of equipment shall be in attendance at the testing to make necessary adjustments. The required tests are as follows:

1. Testing shall comply fully with NFPA 72.
2. Verify the absence of unwanted voltages between circuit conductors and ground. The tests shall be accomplished at the preliminary test with results available at the final system test.
3. Verify that the control unit is in the normal condition as detailed in the manufacturer's operating and maintenance manual.
4. Test and record each initiating device and indicating appliance and circuit for proper operation and response at the control unit, including those associated with all specified system interfaces. Testing of all system interfaces shall be conducted in cooperation with the respective system Contractors to verify that the systems function as specified in the Fire Alarm System Matrix of Operations.
5. Test and record the system for all specified functions in accordance with the contract drawings and specifications and the manufacturer's operating and maintenance manual.
6. Test both primary and secondary power. Verify, by test, the secondary power system is capable of operating the system for the time period and in the manner specified.
7. Determine that the system is operable under trouble conditions as specified.
8. Visually inspect all wiring.
9. Test the battery charger and batteries. Mark the date of the test clearly and legibly directly on the batteries themselves.
10. Verify that all software control and data files have been entered or programmed into the FAP. Hard copy records of the software shall be provided to the Owner.
11. Verify that as-built drawings are accurate.
12. Measure and record the current in circuits to assure there is the specified spare capacity for the circuits.
13. Measure and record the voltage drop at the most remote appliance on each notification appliance circuit to assure that the voltage drop is not excessive.
14. Smoke detectors shall be tested for smoke entry (i.e., go/no-go tests (magnets) are not acceptable). Disconnect the verification feature for smoke detectors during tests to minimize the amount of smoke or test gas needed to activate the detector.

E. Audibility tests shall be performed to verify compliance with the requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG). If the system does not meet the intended performance of the ADAAG, this contractor shall provide additional audible appliances and system expansion parts to accommodate them, as required to meet the required audibility levels.

F. The Distributor shall complete a 100 percent system inspection and test of all controls, devices, auxiliary operations and Supervising Station connections. The Distributor shall complete "Record of Completion" forms for the facility as described in NFPA 72, listing any deviations to the applicable codes and having a representative of the Fire Marshal sign the document. Copies of the completed Record of Completion shall be made available to any and all interested parties and be included in the Operation and Maintenance Manual provided to the Owner.

G. After Final testing is complete, provide a letter certifying that the installation is complete and fully operable to the Professional and the Owner. The letter shall include the names and titles of the witnesses to the preliminary tests and final acceptance tests.

H. Upon completion of a successful acceptance test, the contractor shall so certify in writing to the AHJ.

3.05 TRAINING

A. Provide training session, minimum of two (2) at 1 hour each, for all personnel designated by the Owner. All training sessions shall be conducted prior to, or in conjunction with the testing of the system by an authorized representative of the fire alarm equipment distributor.

B. Training sessions shall cover all aspects of system performance, including system architecture, SLC configurations, sensor and other initiating device types, locations, device addresses, fire alarm control panel function key operation, the system Matrix of Operation, and other functions as designated by the Owner.

C. This training shall include training manuals, demonstration equipment and any other items required to assist the Owner in the operation and maintenance of the systems.

D. Comprehensive system troubleshooting training shall be provided for a single individual designated by Owner. This session shall be separate and distinct from the above described session and be a minimum of 2 hours.

3.06 SPARE PARTS AND TOOLS

A. All spare parts furnished shall be directly interchangeable with the corresponding components of the installed system. Spare parts shall be suitably packaged and identified by nameplate, tagging, or stamping. Spare parts shall be delivered to the site in unopened cartons for storage in the building where directed.

B. Provide the following spare parts and accessories:

1. Spot type smoke detector, 1 of each type installed.
2. Heat detector, 1 of each type installed.
3. Interface Module or Addressable Relay, 1 of each type installed.
4. Manual Pull Stations, 1 of each type installed.
5. Audible/visible appliances, 1 of each type installed.

C. Furnish a list, in duplicate, of all other parts and accessories which the manufacturer of the system recommends to be stocked for maintenance.

3.07 KEYS

A. Keys and locks for all equipment shall be identical. Provide not less than 6 keys of each type required. Identify keys by an appropriate number stamped on each key or on a metal tag attached thereto. Provide a key numbering chart in each operation and maintenance manual.

3.08 WARRANTY

A. The Contractor shall warrant the fire alarm equipment and wiring to be free from inherent mechanical and electrical defects for a period of 1 year from the date of final installation and acceptance of the system by the Owner's representatives.

B. Within these warranties, all parts and the associated labor required for response, trouble shooting, repair and/or replacement are to be included.

3.09 SYSTEM SOFTWARE AND FIRMWARE

A. The contractor shall maintain record copies of all versions of system software installed. Changes in software shall be automatically identifiable when different versions of the system program are compared. Differences between the documents shall be distinctly highlighted to make it distinct from the normal program text.

B. The contractor shall maintain a record of all system firmware provided as part of the equipment. In addition, records shall be maintained of all firmware modifications from initial installation until final acceptance.

C. Provide the Owner with a written copy of all passwords or other access codes for the FAP.

D. Lack of documentation of software or firmware changes shall result in complete system re-acceptance testing.

E. Provide 2 programming changes as directed by the A/E, Owner, or Owner's Representative. This does not include programming changes required to make the system operation meet the contract document requirements and approval of the AHJ.

F. Upon completion of this project, the contractor shall turn over to the Owner the most current, virus-free copy of the downloadable, as-built fire alarm software. This information shall be in the following formats: Printed reproducible hard copy and Virus-Free Electronic Media (USB drive or CD). In addition, any revisions created during the warranty period due to warranty related work shall also be issued to the Owner in the formats described at no additional cost.

END OF SECTION

SECTION 31 3116

TERMITE CONTROL

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes soil treatment.

1.03 RELATED WORK

A. Section 06 1000 - Rough Carpentry or Section 06 1053 - Miscellaneous Rough Carpentry, for wood preservative treatment by pressure process.

B. For wood preservative treatment by pressure process; refer to structural specifications on Drawings for structural sheathing and refer to Section 06 1053 - Miscellaneous Rough Carpentry for non-structural sheathing.

1.04 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation to discuss conformance with project requirements, manufacturer installation requirements, affected adjacent materials and system, and site conditions.

B. Attendees shall include contractor, termite control installer, manufacturer technical representative, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Local Authority Requirements: Provide copy of complete local code requirements for foundation and slab subsurface termite soil treatments. Indicate date requirement was last approved or issued by local officials. Provide direct contact name and phone number of local building official whose jurisdiction that project is under.

C. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components, and profiles for termite control products.

2. Include the EPA-Registered Label for termiticide products.

3. Include manufacturer instructions for installation of termiticide products. Indicate any conflicts with specified requirements and local code requirements.

D. Qualification Data: For qualified Installer.

E. Product Certificates: For each type of termite control product.

F. Soil Treatment Application Report: After application of termiticide is completed, submit report for Owner's records and include the following:

1. Date and time of application.
2. Moisture content of soil before application.
3. Termiticide brand name and manufacturer.
4. Quantity of undiluted termiticide used.
5. Dilutions, methods, volumes used, and rates of application.
6. Areas of application.
7. Water source for application.

G. Sample Warranties: For special warranties.

1.06 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements. Warranty shall be completed in Owner's name and registered with manufacturer.

1.07 QUALITY ASSURANCE

A. Installer Qualifications: A specialist who is licensed according to regulations of code officials to apply termite control treatment and products in the State of Louisiana and county where project is located and who employs workers trained and approved by manufacturer to install manufacturer's products.

1.08 FIELD CONDITIONS

A. Soil Treatment:

1. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with requirements of the EPA-Registered Label and requirements of code officials.
2. Related Requirements: Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction. Treat foundation perimeters.

B. Coordinate installation of perimeter treatment with local authority requirements for areas adjacent to site and foundation drainage components and systems.

1.09 WARRANTY

A. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this section.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer Warranty - Soil Treatment Warranty: Manufacturer's standard form, signed by Applicator and Contractor, certifying that termite control work consisting of applied soil termiticide treatment will prevent infestation of subterranean termites, including Formosan termites (Coptotermes formosanus).

1. If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.
2. Non-prorated against infestation and/or termite damage without additional cost to the Owner during warranty period.
3. Warranty shall include coverage for the amount of 10 percent of the construction cost or One Hundred Thousand Dollars, whichever is less, for damages to building and contents.
4. Warranty shall state dates of application and chemicals used, including quantities and concentrations.
5. Warranty shall state that the policy coverage may be renewable on a year-to-year basis at end of the initial warranty period.
6. Warranty shall be secured with a bond by a licensed surety in the State of Louisiana.
7. If evidence of termites occurs within the warranty period, areas shall be retreated at no cost to the Owner.
8. Warranty Period: Five years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Source Limitations: Obtain termite control products from single source from single manufacturer.

2.02 SOIL TREATMENT

A. Termiticide: EPA-Registered termiticide acceptable to code officials, in an aqueous solution formulated to prevent termite infestation.

B. Acceptable products:

1. BASF Corp., Agricultural Products, Termidor.
2. Bayer Corp., Environmental Science, Premise Preconstruction.
3. Ensystex, Prothor SC2.

C. Service Life of Treatment: Soil treatment termiticide that is effective for not less than five years against infestation of subterranean termites.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for moisture content of soil per termiticide label, interfaces with earthwork, slab and foundation work, landscaping, utility installation, and other conditions affecting performance of termite control.

B. Proceed with application only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. General: Prepare work areas according to the requirements of code officials and according to manufacturer's written instructions before beginning application and installation of termite control treatment(s). Remove extraneous sources of wood cellulose and other edible materials, such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations.

B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated, except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended in writing by termiticide manufacturer.

1. Fit filling hose connected to water source at the site with a backflow preventer, according to requirements of code officials.

3.03 APPLYING SOIL TREATMENT

A. Install in accordance with manufacturer instructions and the requirements of applicable codes.

B. Application: Mix soil treatment termiticide solution to a uniform consistency. Distribute treatment uniformly. Apply treatment at the product's EPA-Registered Label volume and rate for maximum specified concentration of termiticide to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction.

1. General: Provide full coverage application of termiticide at all foundations, footings, and slabs. Do not disturb soils or base at foundations, footings, and slabs during installation. Disturbance of soils and base only permitted at exterior perimeter of foundations and slabs following their completed installation.

2. Slabs-on-Grade and Basement Slabs: Under ground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.
3. Foundations: Soil adjacent to and along the entire inside perimeter of foundation walls; along both sides of interior partition walls; around plumbing pipes and electric conduit penetrating the slab; around interior column footers, piers, and chimney bases; and along the entire outside perimeter, from grade to bottom of footing.
4. Crawlspaces: Soil under and adjacent to foundations. Treat adjacent areas, including around entrance platform, porches, and equipment bases. Apply overall treatment only where attached concrete platform and porches are on fill or ground.
5. Masonry: Treat voids.
6. Penetrations: At expansion joints, control joints, and areas where slabs and below-grade walls will be penetrated.
7. Areas at site and foundation drainage locations: Refer to local authority requirements for application of termiticide at these areas.

C. Post warning signs in areas of application.

D. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

3.04 PROTECTION

A. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.

B. Protect termiticide solution dispersed in treated soils and fills from being diluted by exposure to water spillage or weather until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.

END OF SECTION

SECTION 32 1313

CONCRETE PAVING

PART 1 - GENERAL

1.01 SUMMARY

A. Section contains specifications for installation of pedestrian concrete walkways.

1.02 RELATED SECTIONS

A. Section 32 3300 - Site Furniture

1.03 REFERENCES

A. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
   1. Unless otherwise noted, the Referenced Standard Edition is considered the current edition at the time of commencement of construction.

B. American Concrete Institute (ACI)
   1. ACI 301, Specification for Structural Concrete

C. American Society for Testing and Materials (ASTM)
   1. ASTM C 33, Standard Specification for Concrete Aggregates
   2. ASTM C 94/C 94M, Standard Specification for Ready-Mixed Concrete
   3. ASTM C 150, Standard Specification for Portland Cement
   4. ASTM C 171, Standard Specification for Sheet Materials for Curing Concrete
   5. ASTM C 260, Standard Specification for Air-Entraining Admixtures for Concrete
   6. ASTM C 309, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
   7. ASTM C 1116/C 1116M, Standard specification for Fiber-reinforced Concrete and Shotcrete
   8. ASTM D 1751, Standard Specification for Preformed Sponge Rubber, Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction

D. American Association of State Highway and Transportation Officials (AASHTO)
   1. AASHTO M 182, Standard Specification for Burlap Cloth Made from Jute or Kenaf and Cotton Mats

E. Concrete Reinforcement Steel Institute (CRSI)
   1. CRSI, Manual of Standard Practice

1.04 DEFINITIONS

A. Acceptance: Wherever the terms acceptance or accepted are used herein, they mean acceptance of the Landscape Architect in writing.
B. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash, and other pozzolans, and ground granulated blast-furnace slag.
C. Finished Grade: Elevation of finished surface of concrete paving.

1.05 SUBMITTALS

A. Action Submittals
   1. Installer Qualifications: Documentation demonstrating that the installer has successfully completed concrete paving installation similar in design, material, and extents indicated on this project.
      a. A contractor experienced in manufacturing ready-mixed concrete products that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
      b. Copy of the installer's license and insurance.
   2. Product Data: Documentation for each type of product indicated herein.
   3. Product Samples: Sealed packages containing each type of exposed product demonstrating the finish, color, and texture specified.

B. Informational Submittals
   1. Design Data: For each concrete paving mixture.
      a. Contractor will engage a qualified independent concrete manufacturing and testing agency to design concrete mixtures.
      b. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
   2. Test Results: as specified by local jurisdiction as well as ASTM. Must include the following:
      a. Aggregates.
   3. Material Certificates: Certification from the manufacturer as well as associated vendors that the purchased materials are of good quality according to recognized standards. Must include the following, from manufacturer:
      a. Cementitious Materials
      b. Steel Reinforcement and Reinforcement Accessories
      c. Admixtures
      d. Curing Compounds
      e. Applied Finish Materials
      f. Bonding Agent or Epoxy Adhesive
      g. Joint Fillers
   4. Work Schedules: Written schedule stating in detail the date(s) associated with the installation of this scope of work.

C. Closeout Submittals
   1. Operations and Maintenance Instructions: Documents from the material vendor describing the care and protection of concrete paving(s).

2. Warranties: Copies of associated product, material, and installation warranties.
3. Record Set / As-Built Drawings: Copy of the drawing set that identifies the final location(s) for site elements associated with this scope.

1.06 QUALITY ASSURANCE

A. The Contractor shall maintain an experienced full-time supervisor on site when this scope is in progress. The supervisor shall have successfully completed work similar in design, material, and extent indicated on this project and scope.
B. Pre-installation Meeting: Hold a pre-installation conference, prior to the installation of this scope.
   1. Attendees shall include the Contractor and Landscape Architect.
   2. The meeting agenda will include a review of the product installation requirements, status of site preparation, areas of potential conflicts, and the installer qualifications.
   3. The Contractor shall present a schedule for the installation of this scope as well as a description of the means and methods to be utilized during construction.
C. Mock-Ups: Mock-up will demonstrate the look of the finished system; therefore, it will include examples of top finish (tooling and color), edges, and joints to demonstrate compliance with the specified craftsmanship standards.
   1. Mock-up will be used as the standard by which the work will be judged.
   2. Mock-up may be retained as part of finished work.
      a. Retention of the mock-up is subject to Landscape Architect's acceptance.
      b. If mock-up is not retained, remove and properly recycle or dispose of the mock-up materials.
   3. Mock-up will be at least 10-feet Width by 10-feet Length.
D. Independent Testing: Contractor will engage a qualified independent manufacturing and testing agency to perform material evaluation tests.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.
B. Comply with manufacturer's delivery and storage instructions to avoid degrading the materials.
   1. Delivery: Materials will be delivered in the manufacturer's original, unopened, undamaged containers packaging with identification labels intact.
   2. Storage and protection: Materials will be stored and protected such that they are kept free from mud, dirt, and other foreign materials. Do not store or stockpile materials atop exposed dirt or roots located with the tree protection zone.

1.08 PROJECT SITE CONDITIONS

A. Install all products associated with this scope as recommended by the product manufacturer.
B. Environmental Requirements:
   1. Do not install concrete paving during heavy rain or snowfall.

2. Do not install concrete paving over frozen base materials.
3. Do not install concrete paving on frozen or saturated sand.

C. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

1.09 MAINTENANCE

A. Contractor is responsible for product maintenance from purchase until Final Acceptance.
B. Contractor is responsible for protecting work from damage throughout construction.
C. Contractor is expected to clean and/or replace all materials that appear cracked, chipped, marked, vandalized, dirtied, etc. during the construction process.

1.10 WARRANTY

A. Installer agrees to repair or replace products and accessories that fail in materials and/or workmanship within a specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Uneven settling, crumbing, and/or extensive cracking of paving.
      b. Areas of exposed rebar due to cracking, crumbling, or cutting of paving.

B. Warranty Periods: From date of Substantial Completion.
   1. Warranty Period for Pedestrian Paving: One-year from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Concrete
   1. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.
      a. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
         1) Compressive Strength (28-Days): 3500 psi.
         2) Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.53.
         3) Slump Limit: 4-inches.
         4) Air Content: 2- to 7-percent.
   2. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:
      a. Portland Cement: ASTM C 150, gray Portland cement Type I/II, Type III for high early strength applications only Supplement with the following:
         1) Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

2) Do not use Fly Ash unless authorized in writing by authorities having jurisdiction and the Landscape Architect. If approved, Fly Ash additives must comply with the below requirements.

a) Fly Ash: ASTM C 618, Class C or Class F.

b. Blended Hydraulic Cement: AASHTO M240, Type IS, Type IP, or Type IL cement.

3. Aggregates: ASTM C 33 uniformly graded. Provide aggregates from a single source.
   a. Maximum Coarse: Aggregate Size: 1- to 1 ½-inches nominal
   b. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
   c. Vehicular Paving: Conform to Section 1003.8.3 of LADOTD's Standard Specifications for Roads and Bridges, 2016 Edition for Type B pavement.
4. Water: Potable and complying with ASTM C 94/C 94M.

B. Curing Materials
1. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.
2. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
3. Water: Potable.
4. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.
5. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
6. White, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 2, Class B, dissipating.

C. Fiber Reinforcement
1. Synthetic Fiber: Monofilament polypropylene fibers engineered and designed for use in concrete paving, complying with ASTM C 1116/C 1116M, Type III, 1/2 to 1-1/2 inches long.

D. Steel Reinforcement
1. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from steel wire into flat sheets.
2. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.
3. Epoxy-Coated Welded Wire Reinforcement: ASTM A 884/A 884M, Class A, plain steel.
4. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.
5. Galvanized Reinforcing Bars: ASTM A 767/A 767M, Class II zinc coated, hot dip galvanized after fabrication and bending; with ASTM A 615/A 615M, Grade 60 deformed bars.
6. Epoxy-Coated Reinforcing Bars: ASTM A 775/A 775M or ASTM A 934/A 934M; with ASTM A 615/A 615M, Grade 60 deformed bars.
7. Steel Bar Mats: ASTM A 184/A 184M; with ASTM A 615/A 615M, Grade 60, deformed bars; assembled with clips.
8. Plain-Steel Wire: ASTM A 82/A 82M.
9. Deformed-Steel
10. Wire: ASTM A 496/A 496M.
11. Epoxy-Coated-Steel Wire: ASTM A 884/A 884M, Class A coated.

12. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 plain-steel bars; zinc coated after fabrication according to ASTM A 767/A 767M, Class I coating. Cut bars true to length with ends square and free of burrs.
13. Epoxy-Coated, Joint Dowel Bars: ASTM A 775/A 775M; with ASTM A 615/A 615M, Grade 60, plain-steel bars.
14. Tie Bars: ASTM A 615/A 615M, Grade 60, deformed.
15. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified, and as follows:
    a. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.
    b. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
16. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating, compatible with epoxy coating on reinforcement.
17. Zinc Repair Material: ASTM A 780.

2.02 ACCESSORIES

A. Forms
    1. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
        a. Use flexible or curved forms for curves with a radius of 100-feet or less.
        b. Do not use notched and bent forms.
    2. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

B. Joints
    1. Joint Fillers: Comply with Section 1005 of LADOTD’s Standard Specifications for Roads and Bridges, 2016.

2.03 ADDITIVES

A. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and to contain no more than 0.1-percent water-soluble chloride ions by mass of cementitious material.
    1. Air-Entraining Admixture: ASTM C 260.
    2. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
    3. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
    4. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
    5. Retarding Admixture: ASTM C 494/C 494M, Type B.
    6. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
    7. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.

PART 3 - EXECUTION

3.01 EXAMINATION

A. The Contractor shall examine the site, prior to execution of this scope, noting potential conflicts or changes that may inhibit the work from being installed as indicated on the Drawings.
B. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
   1. The Contractor shall notify the Landscape Architect immediately upon discovery of a conflict.
   2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Field Quality Control: Protect structure, utilities, pavements, plantings, and other existing site elements from damage caused by the installation of this scope.
   1. Protect adjacent and adjoining areas.
   2. Protect grade stakes set by others until directed to remove them.
B. Erosion and Sedimentation Control: Install stormwater pollution prevention measures to avoid erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
C. Site Conditions:
   1. Check existing surface elevations for conformance to survey.
   2. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding.
   3. Remove loose material from compacted subbase surface immediately before placing concrete.

3.03 INSTALLATION

A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated.
B. Consult with Landscape Architect prior to the final installation allowing the Landscape Architect to verify locations and adjust as necessary.
   1. Edge Forms and Screed Construction
      a. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations.
         1) Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
      b. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.
   2. Steel Reinforcement
      a. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

1) Zinc-Coated Reinforcement: Use galvanized-steel wire ties to fasten zinc-coated reinforcement. Repair cut and damaged zinc coatings with zinc repair material.
2) Epoxy-Coated Reinforcement: Use epoxy-coated steel wire ties to fasten epoxy-coated reinforcement. Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M.

b. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

c. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

3. Joints

a. Form construction, expansion, and longitudinal construction joints and tool edges true to line, with faces perpendicular to surface plane of concrete.

b. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints. See Drawings for locations.

1) Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
2) Grooved/Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated.
   a) Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness.
   b) Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch 3/8-inch radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate grooving-tool marks on concrete surfaces.
   c) Tolerance: Ensure that grooved joints are within 2 inches either way from centers of dowels.
3) Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
4) Saw-Cut Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
   a) Tolerance: Ensure that sawed joints are within 2 inches either way from centers of dowels.
   b) Saw-cut may not expose steel reinforcements.

c. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

4. Concrete Mixing

a. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94. Furnish batch certificates for each batch discharged and used in the Work.

1) When air temperature is between 85- and 90-deg F (30- and 32-deg C), reduce mixing and delivery time from 1 ½-hours to 75 minutes; when air temperature is above 90-deg F (32-deg C), and reduce mixing and delivery time to 60-minutes.

b. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94. Mix concrete materials in appropriate drum-type batch machine mixer.

1) For concrete batches of 1-cu. yd. or smaller, continue mixing at least 1 ½-minutes, but not more than 5-minutes after ingredients are in mixer, before any part of batch is released.
2) For concrete batches larger than 1-cu. yd., increase mixing time by 15-seconds for each additional 1-cu. yd.
3) Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

5. Concrete Placement

a. Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast-in.
b. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
c. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
d. Deposit and spread concrete in a continuous operation between joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
e. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.

1) Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.

f. Screed paving surface with a straightedge and strike off.
g. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
h. Cold-Weather Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:

1) When air temperature has fallen to or is expected to fall below 40-deg F, uniformly heat water and aggregate before mixing to obtain a concrete mixture

temperature of not less than 50-deg F and not more than 80-deg F at point of placement.
2) Do not use frozen materials or materials containing ice or snow.
3) Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.

i. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:

1) Cool ingredients before mixing to maintain concrete temperature below 90-deg F time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2) Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3) Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

6. Float Finishing

a. Do not add water to concrete surfaces during finishing operations.
b. Begin the second floating operation when bleed-water sheen has disappeared, and concrete surface has stiffened sufficiently to permit operations.

1) Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units.
2) Finish surfaces to true planes.
3) Cut down high spots and fill low spots.
4) Refloat surface immediately to uniform granular texture.

a) Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1/16- to 1/8-inch deep with a stiff-bristled broom, perpendicular to line of traffic.

7. Curing

a. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
b. Comply with ACI 306.1 for cold-weather protection.

1) Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2-lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.

c. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
d. Cure concrete by applying curing compound uniformly in continuous operation by power spray or roller according to manufacturer's written instructions.

e. Recoat areas that have been subjected to heavy rainfall within three hours after initial application.
f. Maintain continuity of coating, and repair damage during curing period.

3.04 TOLERANCES

A. Comply with tolerances in ACI 117 and as follows:
1. Elevation: 1/2-inch.
2. Thickness: Plus 3/8-inch, minus ¼-inch.
3. Surface: Gap below 10-foot- (3-m-) long, unleveled straightedge not to exceed ½-inch.
4. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: ½-inch per 12-inches of tie bar.
5. Lateral Alignment and Spacing of Dowels: 1-inch.
6. Vertical Alignment of Dowels: ¼-inch.
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: ¼-inch per 12-inches of dowel.
8. Joint Spacing: 3-inches.
9. Construction Joint Depth: Plus ¼-inch, no minus.
10. Joint Width: Plus 1/8-inch, no minus.

3.05 CLEANING

A. The Contractor shall maintain the installed work, related to this scope, as recommended by the associated product and material manufacturers as well as ASTM standards.

3.06 REVIEW

A. The Contractor shall notify the Landscape Architect as key portions of the work is completed. The Landscape Architect will visit the site to review the work.
B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Test results shall be reported in writing to Landscape Architect, concrete manufacturer, and Contractor within 48 hours of testing.
a. Testing Agency: The Contractor will engage a qualified testing agency to perform tests and inspections.
b. Testing Frequency: Obtain at least three composite samples for each 50-cubic yards placed each day.
1) When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
c. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
d. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

e. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when it is 80 deg F and above, and one test for each composite sample.
f. Compression Test Specimens: ASTM C 31; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
g. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28-days.
   1) A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28-days.
   2) Strength of each concrete mixture will be satisfactory if average of any three-consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500-psi.
   3) Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28-days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
h. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
i. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Landscape Architect.

2. Concrete paving will be considered defective if it does not pass tests and inspections.
3. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
4. Prepare test and inspection reports.

3.07 MAINTENANCE

A. The Contractor shall maintain the installed work, related to this scope, as recommended by the associated product and material manufacturers as well as ASTM standards.

3.08 PROTECTION

A. After work in this section is complete, the Contractor shall be responsible for protecting work from damage due to subsequent construction activity on the site.
B. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
C. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

3.09 REPAIRS

A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section.
   1. Remove work in complete sections from joint to joint unless otherwise approved by Landscape Architect.

B. Drill test cores, where directed by Landscape Architect, when necessary to determine magnitude of cracks or defective areas.
   1. Fill drilled core holes in satisfactory paving areas with Portland cement concrete bonded to paving with epoxy adhesive.

END OF SECTION

Bid Set Issue Date: 12/5/2025

SECTION 32 3121

DUMPSTER ENCLOSURE GATES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES

A. Decorative dumpster enclosure gates.

1.03 REFERENCE STANDARDS

A. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes.

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

C. ASTM F2408 - Standard Specification for Ornamental Fences Employing Galvanized Steel Tubular Pickets.

1.04 PREINSTALLATION CONFERENCES

A. Preinstallation Conference: Conduct conference at Project site minimum fourteen days prior to installation to discuss conformance with project requirements, manufacturer installation requirements, affected adjacent materials and system, and site conditions.

B. Attendees shall include contractor, gate assembly installer, and installers of adjacent materials and systems.

C. Conduct meeting in accordance with Section 01 3100 - Project Management and Coordination.

1.05 SUBMITTALS

A. Refer to Section 01 3300 - Submittal Procedures, for submittal procedure requirements.

B. Product Data: Submit manufacturer's data sheets on each product to be used.

1. Finish data.

C. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.

1. Delegated-Design Submittal: For gates, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
2. Include the design engineer's seal and signature on each sheet of shop drawings.

3. Include project wind load design calculations for gate panels and accessory selections as well as post spacing and foundation details.
4. Include welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
5. Include details and elevations of all components including dimensions, finishes, and material types.
6. Include plan layout, spacing of components, post foundation dimensions, fastener locations, hardware anchorage, gates, and schedule of components.
7. Include foundation details, concrete mix and reinforcing for footings.
8. Prepare shop drawings using field measurements of installation areas.

D. Samples for Selection: Provide manufacturer standard color charts for finish and color selections.

E. Samples for Verification: Provide physical material samples in size and quantity requested by Architect.

F. Installer's Qualification Statement.

1.06 CLOSEOUT SUBMITTALS

A. Special Installer Warranty: Executed warranty meeting specified requirements.

B. Special Manufacturer Warranty: Executed warranty meeting specified requirements. Warranty shall be completed in Owner's name and registered with manufacturer.

C. Special Manufacturer Finish Warranty: Executed warranty meeting specified requirements.

D. Maintenance Data: Provide manufacturer parts lists, operation, and maintenance instructions for the materials of this Section.

1.07 QUALITY ASSURANCE

A. Delegated-Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State of Louisiana, or personnel under direct supervision of such an engineer.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience.

C. Installer Qualifications: Minimum five years of experience installing the materials specified.

1.08 DELIVERY, STORAGE AND HANDLING

A. Store materials in a manner to ensure proper ventilation and drainage. Protect against damage, weather, vandalism and theft.

1.09 WARRANTY

A. Special Manufacturer/Fabricator Finish Warranty: Manufacturer/fabricator shall warranty that coated/painted finishes will not crack, peel or blister.

1. Warranty Term: Ten years from date of Substantial Completion.

B. Special Installer Warranty: Furnish a written warranty signed by the installer guaranteeing materials and workmanship for the Work of this section.

1. Warranty Period: One year from date of Substantial Completion.

PART 2 PRODUCTS

2.01 PERFORMANCE REQUIREMENTS

A. Delegated-Design: Design gates under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of Louisiana.

1. Fabricated items shall comply with requirements of applicable codes, including wind resistance. Coordinate with requirements and recommendations of CLFMI WLG 2445 for post.

2. Include complete design of each item or assembly including materials, accessories, securement and anchorage, substrates, and finishing requirements.

B. Allow for expansion and contraction of members and building movement without damage to connections or members.

C. Provide anchors and other components as required to attach to structure, made of same materials as gate components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.

2.02 DUMPSTER ENCLOSURE GATES - CORRUGATED STEEL PANEL

A. For use at trash/dumpster enclosure.

B. Acceptable Manufacturers: Provide products by one of the following for steel gates:

1. Basis of Design: Commercial heavy duty corrugated steel panel swing gates in vertical configuration.

2. Additional Manufacturers: Subject to compliance with specified requirements.

a. Ametco Manufacturing Corporation. www.ametco.com

b. Comet Fence, Inc. www.cometfence.com

c. Fence Workshop, Inc. www.fenceworkshop.com

d. Fusion Metalworks. www.fmetalworks.com

e. Omega Fence Systems, Inc. www.omegafence.com

f. Seegars Fence Company. www.seegarsfence.com

C. Gates: Complete assembly of gate, posts and panels, accessories, fittings, and fasteners; finished with factory/shop applied powder coating, and having the following performance characteristics:

1. Capable of resisting vertical load, horizontal load and infill performance requirements for gate and fence categories defined in ASTM F2408.

D. Description: Size and configuration as indicated on Drawings.

1. Prefabricated design, electro-forged welded steel.
2. Vertical heavy duty corrugated steel decking with steel angle frame on all sides.
   a. B Deck (HSB-36). Minimum 18 ga. Hot-dip galvanized; ASTM A653/A653M, G90.
3. Galvanized in accordance with ASTM 123 and factory powder coated.
4. Main Bar: Minimum 4 inch by 4 inch by 1/4 inch formed main bar.
5. Cross Bar: Minimum 4 by 1/4 inch formed cross bar.
6. Vertical Gate Support Post: As indicated on Drawings to match gate.

E. Steel: ASTM A653/A653M; tensile strength 45,000 psi (310 MPa), minimum.

1. Hot-dip galvanized; ASTM A653/A653M, G90.

F. Fasteners: ASTM A276/A276M, Type 302 stainless steel; finished to match gate components.

1. Tamper-proof security bolts.

G. Hinges: Ball bearing sleeved style finished to match gate components.

1. Mounting: Centered on gate and gate vertical mounting post.
2. Closing: Manual.
3. Minimum four hinges per leaf. Provide additional hinges where leaf weight plus safety factor of 1.5, exceeds hinge load capacity.

H. Cane Bolts: Vertical cane bolts.

1. Fabricated from minimum 5/8 inch stainless steel round bar.
2. Provide bottom embedment sleeve and mounting brackets, screws, and hardware.
3. Provide cane bolt retainer mechanism minimum 1 inch deep by 2 inches high by 3 inch wide with open top. Refer to Drawings for configuration.
   a. Mounting: Flush on face of gate frame.
   b. Locking: Mechanical.

2.03 AUXILIARY COMPONENTS

A. Bituminous Paint/Coating: Refer to Section 07 1115 - Protective Bituminous Paint Coating.

1. Coordinate with requirements of product/material manufacturer(s) of this Section.
2. For use as corrosion protection between dissimilar materials.
3. Apply in two coats for full coverage minimum 30 dry mil thickness, unless indicated otherwise.

2.04 METAL FINISHES

A. General: Provide one finish as indicated.

1. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
2. Finish of all permanently exposed areas of steel components shall be applied in accordance with the appropriate AAMA Voluntary Guide Specification indicated.
3. Permanently Concealed Finishes: Factory mill finish. All other permanently exposed surfaces shall be factory painted/prefinished.

B. FEVE Superior Performance Organic Powder Coating: Conforming to AAMA 2605 and as follows:

1. Fluoroethylene vinyl ether (FEVE): Superior performance IFS 100% FEVE resin based fluoropolymer powder coated finish. Zero VOC formulation.
2. Coats: Minimum two coat finish over steel with primer as required by coating manufacturer to comply with specified requirements
3. Scratch resistance shall meet or exceed a pencil test of H in accordance with (ASTM D3363), “Standard Test Method for Film Hardness by Pencil Test”.
4. Abrasion resistance shall meet or exceed a Taber abrasion test of 1000 rotations in accordance with (ASTM D4060), “Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser”.

C. PVDF (Polyvinylidene fluoride) Superior Performance Organic Multi-Coat System: Complying with AAMA 2605; and as follows:

1. Including at least 70 percent PVDF, FSF-free resin, and having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch (0.030 mm).
2. Coats: Minimum two coat finish with primer as required by coating manufacturer to comply with specified requirements.
3. Finish Type: Arkema Group, Kynar 500, Sherwin Williams Fluropon, PPG Duranar, or Solvay Solexis, Inc., Hylar 5000 resin (Polyvinylidene fluoride, PVDF), formulated by a licensed manufacturer and applied by manufacturer's approved applicator to meet AAMA 2605.

D. Color Selection: Color as selected by Architect from manufacturer full range.

E. Touch-Up Materials: As recommended by finish manufacturer for field application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Proceed with installation only after unsatisfactory conditions have been corrected. Installation of materials of this Section indicates acceptance of substrates and conditions.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions and recommendations.

B. Set vertical support posts in accordance with the manufacturer recommended spacing and Delegated-Design requirements.

1. Coat metal in contact with concrete with two full coverage coats of bituminous paint.

C. When field cutting is required immediately seal the exposed surfaces by:

1. Removing metal shavings from cut area.
2. Apply zinc-rich primer to thoroughly cover cut edge and drilled hole; allow to dry.
3. Apply two coats of custom finish manufacturer provided touch-up paint matching gate color.

D. Space posts according to the manufacturers' drawings, dependent on standard out-to-out gate leaf dimensions and gate hardware selected.

1. Base type and quantity of gate hinges on the application; weight, height, and number of gate cycles.
2. Provide gate hardware by the manufacturer of the gate and install in compliance with manufacturer's recommendations.

3.03 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch (6.3 mm).

B. Maximum Offset From Indicated Position: 1 inch (25.4 mm).

C. Minimum Distance from Property Line: 6 inches (152 mm).

3.04 FIELD QUALITY CONTROL

A. Post Settings: Inspect all locations against design for:

1. Hole diameter.
2. Hole depth.
3. Hole spacing.

B. Gates: Inspect for level, plumb, alignment, and smooth operation.

3.05 CLEANING

A. Clean jobsite of excess materials; scatter excess material from post hole excavations uniformly away from posts. Remove excess material if required.

B. Clean mild household detergent and clean water rinse well.

C. Remove mortar from exposed posts and other gate material with cleaner and cleaning method acceptable to gate fabricator/manufacturer.

D. Touch up scratched surfaces using manufacturer provided touch up paint materials as recommended by gate manufacturer/fabricator. Match touched-up paint color to factory-applied finish.

3.06 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair, or replace damaged products before date of Substantial Completion.

END OF SECTION

SECTION 32 3300

SITE FURNISHINGS

PART 1 - GENERAL

1.01 SUMMARY

A. Section contains specifications for the installation of pre-fabricated exterior site furniture as well as their accessories.
B. Section includes
   1. Benches
   2. Tables
   3. Chairs

1.02 RELATED SECTIONS

A. Section 32 1313 – Concrete Paving

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM)
   1. ASTM A 123/A 123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
   2. ASTM A 153/A 153M, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
   3. ASTM A 924/A 924M, 8a Standard Specification for General Requirements for Steel Sheet, Metallic-coated by the Hot-dip Process
   4. ASTM C 1107, Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink)

1.04 DEFINITIONS

A. Acceptance: Wherever the terms acceptance or accepted are used herein, they mean acceptance of the Landscape Architect in writing.
B. Finished Grade: Elevation of finished surface of planting soil.
C. Subgrade: The soil surface on which aggregate base or cement-treated base is placed.

1.05 SUBMITTALS

A. Action Submittals
   1. Installer Qualifications: Documentation demonstrating that the installer has successfully completed exterior furniture installation similar in design, material, and extents indicated on this project.
      a. Copy of the installer’s license and insurance.

2. Shop Drawings/ Contractor's drawings and details (as needed): Indicate perimeter conditions, relationship to adjoining materials and assemblies, expansion and control joints, concrete paver layout, patterns, color arrangement, installation, and setting details
3. Product Data: Documentation for each type of product indicated herein.
4. Product Samples: Sealed containers or bags containing each type of exposed finish.

B. Informational Submittals

1. Material Certificates: Certification from the furniture as well as associated vendors that the purchased materials are of good quality according to recognized standards.
    a. Certification documents will include associated product design and testing data.
2. Work Schedules: Written schedule stating in detail the date(s) associated with the installation of this scope of work.

C. Closeout Submittals

1. Operations and Maintenance Instructions: Documents from the material vendor describing the care and protection of site furniture.
2. Warranties: Copies of associated product, material, and installation warranties.
3. Record Set / As-Built Drawings: Copy of the drawing set that identifies the final location(s) for site elements associated with this scope.
4. Stock Materials: Provide additional materials for use by Owner for maintenance and repair.
    a. Fabricated materials shall be from the same production run as installed materials.
    b. Paint(s), fillers, and sealants, used for touch-ups, shall match the installed material.
        1) Contractor to provide stock paint, filler, and sealant equal to manufactures written recommendation for use within two calendar years.
5. Associated Tools: Provide a set of tools used to construct/deconstruct and anchor the furniture.

1.06 QUALITY ASSURANCE

A. The Contractor shall maintain an experienced full-time supervisor on site when this scope is in progress. The supervisor shall have successfully completed work similar in design, material, and extent indicated on this project and scope.

B. Pre-installation Meeting: Hold a pre-installation conference, prior to the installation of this scope.

1. Attendees shall include the Contractor and Landscape Architect, as well as the product installer and a manufacturer's designated representative (if available).
2. The meeting agenda will include a review of the product installation requirements, status of site preparation, areas of potential conflicts, and the installer qualifications.
3. The Contractor shall present a schedule for the installation of this scope as well as a description of the means and methods to be utilized during construction.

C. Mock-Ups: Mock-up will demonstrate the look of the finished system; therefore, it will include examples of mounting to demonstrate compliance with the specified craftsmanship standards.

1. Refer to INSTALLATION and FIELD QUALITY ASSURANCE sections under Part Three - Execution in this specification.
2. Mock-ups will be used as the standard by which the work will be judged.
3. Mock-ups may be retained as part of finished work.
    a. Retention of the mock-up is subject to Landscape Architect's acceptance.
    b. If mock-up is not retained, remove and properly recycle or dispose of the mock-up materials.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.
B. Comply with manufacturer's delivery and storage instructions to avoid degrading the materials.
    1. Delivery: Materials will be delivered in the manufacturer's original, unopened, undamaged containers packaging with identification labels intact.
    2. Storage and protection: Materials will be stored and protected such that they are kept free from mud, dirt, and other foreign materials. Do not store or stockpile materials atop exposed dirt or roots located with the tree protection zone.

1.08 PROJECT SITE CONDITIONS

A. Install all products associated with this scope as recommended by the product manufacturer.
B. Environmental Requirements:
    1. Do not install site furniture elements during heavy rain or snowfall.
    2. Do not install site furniture elements over frozen base materials.

1.09 MAINTENANCE

A. Contractor is responsible for product maintenance from purchase until Final Acceptance.
B. Contractor is responsible for protecting work from damage throughout construction.
C. Contractor is expected to clean and/or replace all materials that appear cracked, chipped, marked, vandalized, dirtied, etc. during the construction process.

1.10 WARRANTY

A. Installer agrees to repair or replace products and accessories that fail in materials and/or workmanship within a specified warranty period.
    1. Failures include, but are not limited to, the following:
        a. Cracking and/or chipping of site furniture finish
        b. Breaking of site furniture components
        c. Uneven settling of mounting pad
        d. Structural failures including site furniture falling or blowing over.
B. Warranty Periods: From date of Substantial Completion.
    1. Warranty Period for site furniture: One-year from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 BENCHES

A. Basis-of-Design Product(s): Subject to compliance with requirements, provide the product indicated herein or submit an equal alternative product for approval:

1. Site Bench

a. Manufacturer: Landscape Forms
b. Manufacturer Representative: Mallary Morvant, mallarym@landscapeforms.com
c. Product: Link Bench, Piano Keys
d. Materials & Colors:

1) Metal color: Terra
2) Wood: Thermally Modified Ash

e. Size: 140-inch radius (center line)
f. Customization: metal etching; artwork to be provided to the Manufacturer
g. Installation: Surface Mounted

1) The exact location will be field verified by the Landscape Architect prior to installation.

2.02 CHAIRS

A. Basis-of-Design Product(s): Subject to compliance with requirements, provide the product indicated herein or submit an equal alternative product for approval:

1. Lounge Chair & Double Lounge Chair

a. Manufacturer: Landscape Forms
b. Manufacturer Representative: Mallary Morvant, mallarym@landscapeforms.com
c. Product: Americana Chair
d. Color:

1) Seat Color: Apple Red
2) Support Frame: Mango

e. Installation: Free standing

2.03 TABLES

A. Basis-of-Design Product(s): Subject to compliance with requirements, provide the product indicated herein or submit an equal alternative product for approval:

1. Side Tables

a. Manufacturer: Landscape Forms
b. Manufacturer Representative: Mallary Morvant, mallarym@landscapeforms.com
c. Product: Harvest Side Table
d. Color:

1) Top Color: Apple Red
2) Support Frame: Mango

e. Installation: Free standing

2.04 ACCESSORIES

A. Anchors, Fasteners, Fittings, and Hardware: Manufacturer's standard, corrosion-resistant-coated or non-corrodible materials; commercial quality, tamperproof, vandal and theft resistant.

2.05 SUBSTITUTIONS

A. Substitutions that alter the desired look of the design are not encouraged, and (generally) will not be allowed if they substantially change the design intent.
B. When submitting an alternative product or material:
   1. The Contractor shall provide complete data showing compliance with the Contract Documents.
   2. The Contractor represents that she/he:
      a. Has investigated the proposed substitution and found that it is of the same or better quality, level, capacity, function, or appearance than the specified product.
      b. Has conducted analysis demonstrating the substituted product fully integrates with other specified products and equipment.
      c. Will coordinate the installation and make all modifications to the work which may be required for complete installation.
      d. Will bear all costs resulting from necessary changes caused by the substitution.
   3. The Landscape Architect will determine acceptance of proposed substitution, and the Landscape Architect will notify the Contractor of the product’s acceptance or rejection.

2.06 FABRICATION

A. Erosion-Resistant Anchoring Cement: Factory-packaged, non-shrink, non-staining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pourable anchoring, patching, and grouting compound
   1. resistant to erosion from water exposure without needing protection by a sealer or waterproof coating
   2. Must state in writing by manufacturer “FOR EXTERIOR APPLICATIONS”
B. Non-shrink, Nonmetallic Grout: Premixed, factory-packaged, non-staining, noncorrosive, nongaseous grout
   1. Must comply with ASTM C 1107
   2. Must state in writing by manufacturer “FOR EXTERIOR APPLICATIONS”
C. Exposed Surfaces: Polished, sanded, or otherwise finished; all surfaces smooth, free of burrs, barbs, splinters, and sharpness
   1. All edges and ends rolled, rounded, or capped.
D. Factory Assembly: Assemble components in the factory to the greatest extent possible to minimize field assembly. Clearly mark units for assembly in the field.

PART 3 - EXECUTION

3.01 EXAMINATION

A. The Contractor shall examine the site, prior to execution of this scope, noting potential conflicts or changes that may inhibit the work from being installed as indicated in the Drawings.
   1. The Contractor shall notify the Landscape Architect immediately upon discovery of a conflict.

3.02 PREPARATION

A. Field Quality Control: Protect structure, utilities, pavements, plantings, and other existing site elements from damage caused by the installation of this scope.
   1. Protect adjacent and adjoining areas.
   2. Protect grade stakes set by others until directed to remove them.

B. Site Conditions: Check existing surface elevations for conformance to survey.

3.03 INSTALLATION

A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated.
B. Consult with Landscape Architect prior to the final installation allowing the Landscape Architect to verify locations and adjust as necessary.

3.04 TOLERANCES

A. An acceptable site furniture installation is defined as a group of installed site furniture items in pristine condition placed in their designated locations at the time of Final Acceptance by the Landscape Architect.
B. Site Furnishing installations shall meet the following criteria as determined by Landscape Architect:
   1. Furniture shall meet the specified species and size.
      a. Furniture of the same type shall have the same manufacturer, product, and size match aesthetically.
   2. Furniture is free of uncorrected structural and superficial damage.
   3. Furniture is located at their specified elevation.

3.05 CLEANING

A. The Contractor shall maintain the installed work, related to this scope, as recommended by the associated product and material manufacturers as well as ASTM standards.

3.06 REVIEW

A. The Contractor shall notify the Landscape Architect as key portions of the work is completed. The Landscape Architect will visit the site to review the work.
B. Tolerances:

3.07 MAINTENANCE

A. The Contractor shall maintain the installed work, related to this scope, as recommended by the associated product and material manufacturers as well as ASTM standards.

3.08 PROTECTION

A. After work in this section is complete, the Contractor shall be responsible for protecting work from damage due to subsequent construction activity on the site.
B. materials will not be measured for payment of this bid item.

END OF SECTION

SECTION 32 9113

SOIL PREPARATION

PART 1 - GENERAL

1.01 SUMMARY

A. Section contains specifications for planting soils specified according to performance requirements of the mixes.
B. Section includes
   1. Amended Soils (Amended Existing Top soil)
   2. Bed Builder Soils

1.02 RELATED SECTIONS

A. Section 32 93 00 – Plants

1.03 REFERENCES

A. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
   1. Unless otherwise noted, the Referenced Standard Edition is considered the current edition at the time of commencement of construction.
B. American Society for Testing and Materials (ASTM)
   1. ASTM E2399/E2399M – Standard Test Method for Maximum Media Density for Dead Load Analysis of Vegetative (Green) Roof Systems
   2. ASTM D 698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort
C. Soil Science Society of America (SSSA)
D. United States Composting Council (USCC)

1.04 DEFINITIONS

A. Acceptance: Wherever the terms acceptance or accepted are used herein, they mean acceptance of the Landscape Architect in writing.
B. CEC: Cation exchange capacity.
C. Finished Grade: Elevation of finished surface of planting soil.
D. Imported Soil: Soil that is transported to Project site for use.
E. Manufactured Soil: Soil produced by blending soils, sand, stabilized organic soil amendments, and other materials to produce planting soil.
F. Organic Matter: The total of organic materials in soil exclusive of undecayed plant and animal tissues, their partial decomposition products, and the soil biomass; also called "humus" or "soil organic matter."

G. Planting Soil: Existing soil, on-site soil; imported soil; lightweight structural soil, bioretention soil; amended soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
H. RCRA Metals: Hazardous metals identified by the EPA under the Resource Conservation and Recovery Act.
I. Soil Report: Document produced by qualified soil testing lab that details the existing conditions of soil samples as well as provides recommendations on soil modifications allowing the soil to support plant life.
J. Subgrade: The soil surface on which aggregate base or cement-treated base is placed.

1.05 SUBMITTALS

A. Action Submittals
1. Installer Qualifications: Documentation demonstrating that the installer has successfully completed manufactured soil installations similar in design, material, and extents indicated on this project.
a. Copy of the installer's license and insurance.
2. Product Data: Documentation for each type of product indicated herein.
3. Product Samples: Sealed containers or bags containing each type of soil.
a. Prior to ordering the soil materials, submit representative composite samples to the Landscape Architect for approval a minimum of 4-weeks prior to anticipated start date.
b. Representative samples shall be in a sealed, 1-gallon container, labeled with content, source, and date obtained, providing an accurate representation of composition, color, and texture.
c. Samples from the supplier should not be more than 1 week old when delivered to the Landscape Architect.
d. Do not order materials until Landscape Architect's approval has been obtained.
e. Site delivered materials shall closely match the approved samples.

B. Informational Submittals
1. Testing: In accordance with ASTM, the following test shall be conducted on manufactured and amended soils:
a. Bulk Density
b. Infiltration
c. Nutrient Load
d. Organic Content
e. Soil pH
f. Texture
2. Testing Agencies: Contractor to provide the name(s), location, phone number, and email address of persons conducting tests.
a. Employ, at Contractor's expense, a qualified independent testing and inspection laboratory acceptable to the Landscape Architect to perform all tests and certifications as specified herein, including both laboratory and field-testing. Tests

shall be made in strict compliance with the standards of the ASTM or as described herein.

1) It is the responsibility of the Landscape Contractor and the Soil Supplier to submit material for the soil and compost tests.

b. The Contractor shall be responsible for recognizing that the procurement process and testing of these materials may be considered a long lead time. Under no circumstance shall failure to comply with all specification requirements be a reason for the substitution of unacceptable material(s).

c. Testing Agency Qualifications: An independent, state-operated, or university-operated laboratory; experienced in soil science, soil testing, and plant nutrition; with the experience and capability to conduct the testing indicated; and that specializes in types of tests to be performed. Geotechnical engineering testing labs shall not be used.

d. Test Report and Results: Results shall be provided on the testing agency's letterhead and clearly state that the tested soil complies with the specifications stated herein.

1) Soil Report shall include the existing conditions of the soil as well as provide recommendations for improving the soil quality.

3. Material Certificates: Certification from the soil mixer as well as associated vendors that the purchased materials are of good quality according to recognized standards.

a. Provide certificates for any composted materials, soil blend components, fertilizers, and/or pesticides prior to the delivery or use of any materials or products on site.

b. Include product sheets for each component of every soil mix described in the specification herein.

4. Work Permit: Approved municipal permit for work conducted on city owned property and city governed private property.

a. Contractor must also contact Louisiana One Call and have utilities clearly marked prior to conducting soil work. LA One Call receipts shall be submitted to Landscape Architect.

5. Work Schedules: Written schedule stating in detail the date(s) associated with the installation of this scope of work.

C. Closeout Submittals

1. Operations and Maintenance Instructions: Documents from the material vendor, describing the care, protection, and replacement of soils.
2. Warranties: Copies of associated product, material, and installation warranties.
3. Record Set / As-Built Drawings: Copy of the drawing set that identifies the final location(s) for site elements associated with this scope.

1.06 QUALITY ASSURANCE

A. The Contractor shall maintain an experienced full-time supervisor on site when this scope is in progress. The supervisor shall have successfully completed work similar in design, material, and extent indicated on this project and scope.

B. Pre-installation Meeting: Hold a pre-installation conference, prior to the installation of this scope.
   1. Attendees shall include the Contractor and Landscape Architect, as well as the product installer and a manufacturer's designated representative (if available).
   2. The meeting agenda will include a review the product installation requirements, status of site preparation, areas of potential conflicts, and the installer qualifications.
   3. The Contractor shall present a schedule for the installation of this scope as well as a description of the means and methods to be utilized during construction.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Comply with Division 01 Product Requirement Section (01 60 00).
B. Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.
C. Comply with manufacturer's delivery, storage, and handling instructions to avoid degrading the materials.
   1. Contractor is responsible for requesting and adhering to manufacturer and blender product instructions.
      a. Contractor to notify Landscape Architect immediately if there is a conflict between the manufacturer and blender instructions as well as the design specifications.
   2. Material shall not be handled, haul, delivered, or compacted when it is saturated or frozen.
      a. Delivery: Materials will be delivered in the manufacturer's original, unopened, undamaged containers packaging with identification labels intact.
         1) Deliver materials only after preparations for the placement of the imported soils have been completed and approved by the Landscape Architect.
         2) Materials should be delivered in a sequenced method to avoid prolonged storage, which will increase potential for material loss due to erosion.
         3) Materials should be delivered in a sequenced method to avoid delays in construction due to on-site storage space limitations.
         4) Deliver chemical amendments in original, unopened containers with original labels intact and legible, which state the guaranteed chemical analysis.
      b. Storage and Protection: Materials will be stored and protected such that they are kept free from foreign mud, dirt, and other foreign materials.
         1) Cover stored soils to avoid wind and water erosion.
         2) Store soils atop stable hardscape surface.
            a) Do not store or stockpile materials atop exposed dirt or roots located with the tree protection zone.
         3) Store chemicals in a weather protected enclosure.
      c. Handling: Materials will only be handled when they are in dry (not-saturated) condition.
         1) Prohibit vehicular and pedestrian traffic around stockpiled and recently placed soil.

2) Contractor shall not move, blend, or grade soils when moisture content is so great that excessive compaction will occur, nor when it is so dry that dust will form in the air.

1.08 PROJECT SITE CONDITIONS

A. Install all products associated with this scope as recommended by the product manufacturer.
B. Environmental Requirements:
   1. Do not install soils during heavy rain or snowfall.
   2. Do not install soils over frozen base materials.
   3. Do not install frozen sand or saturated soils.
   4. Do not install soils on frozen or saturated subgrade.

1.09 MAINTENANCE

A. Contractor is responsible for product maintenance from purchase until Final Acceptance.
B. Contractor is responsible for protecting work from damage throughout construction.
C. Contractor is expected to clean and/or replace all materials that appear cracked, chipped, marked, vandalized, dirtied, etc. during the construction process.

1.10 WARRANTY

A. Installer agrees to repair or replace products and accessories that fail in materials and/or workmanship within a specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Loss of soil volume due to erosion.
      b. Loss of soil volume due to subsidence or sink holes.
B. Warranty Periods: From date of Substantial Completion.
   1. Warranty Period for Site Soils: One-year from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 PLANTING SOILS

A. Basis-of-Design Product(s): Subject to compliance with requirements, provide the product indicated herein or submit an equal alternative product for approval:
   1. Site Soil A:
      a. Amended On-site Soil: Existing, on-site top soil stockpiled on-site or off-site at a secure facility; modified to produce viable soil for proposed planting.
         1) Soil must comply with the following requirements:
            a) Particle Size Distribution by USDA Textures: Classified as sandy loam according to USDA textures.
            b) Percentage of Organic Matter: Minimum 6-percent by volume.
            c) Soil Reaction: pH between 6.0 to 7.0

d) CEC of Total Soil: Minimum 10-meq/100-mL at pH of 7.0
e) Soluble-Salt Content: 5 to 10 dS/m measured by electrical conductivity.
f) Bulk Density: 1.2-g/cu. cm to 1.4-g/cu. cm at 85-percent compaction.
g) Total Porosity: Minimum 55-percent at 85-percent compaction.
h) Macro Porosity: Minimum 15=percent at 85-percent compaction.
i) RCRA Metals: Below maximum limits established by the EPA.
j) Phytotoxicity: Below phytotoxicity limits established by SSSA.

2) Utilize local soil blender to modify existing site soils into specified amended soil
a) Soil amendments and modifications recommendations identified using Contractor facilitated soil testing and analyses.

2. Site Soil B
a. Bed Builder Soils: Imported topsoil or manufactured topsoil from off-site sources; consisting of manufacturer's specified materials blended in a manufacturing facility.
1) Do not obtain from agricultural land, bogs or marshes.
2) Verify suitability of soil to produce viable planting soil.
3) Clean soil of roots, plants, sod, stones, clods, clay lumps, pockets of coarse sand, concrete slurry, concrete layers or chunks, cement, plaster, building debris, and other extraneous materials harmful to plant growth.
4) Mix soil with the following soil amendments and fertilizers in the following quantities to produce planting soil:
a) Retain applicable subparagraphs below or revise to suit Project.
b) Ratio of Loose Compost to Topsoil by Volume: 1:2.
c) Ratio of Loose Sphagnum Peat to Topsoil by Volume: 1:4
d) Ratio of Loose Wood Derivatives to Topsoil by Volume: 1:5
e) Add the following items as recommended by Soil Report:
i. Weight of Lime per 1000-Sq. Ft.
ii. Weight of Sulfur, Iron Sulfate, Aluminum Sulfate per 1000-Sq. Ft.
iii. Weight of Agricultural Gypsum per 1000-Sq. Ft.,
iv. Volume of Sand Plus 10% Diatomaceous Earth per 1000 Sq. Ft.
v. Weight of Bonemeal per 1000 Sq. Ft.
vi. Weight of Superphosphate per 1000 Sq. Ft.
vii. Weight of Commercial Fertilizer per 1000 Sq. Ft.
viii. Weight of Slow-Release Fertilizer per 1000 Sq. Ft.

2.02 MATERIALS

A. Sands Particles
1. Grain size between 0.056 – 1.0 mm in size, average
2. Must comply with ASTM C 33/C 33M.
a. Clean, washed, natural or manufactured as well as be free of toxic materials and foreign seeds
1) Pump Sand must be washed free of seeds

2) Mason Sand must be amended to compensate for overly acidic or alkaline pH, as need

B. Silts Particles
   1. Grain size between 0.002-mm – 0.06-mm in size, average

C. Clay Particles
   1. Grain size < 0.002-mm in size, average
   2. Crushed and silted so that no aggregate particles are larger than 2-cm DIA

D. Sandy Loam Soil
   1. Soil Texture comprised of 70% sand, 15% silt, 15% clay

2.03 ADDITIVES

A. Amendments:
   1. Organic Soil Amendments:
      a. Compost: Blended and ground leaf, wood, and other plant based material composted for a minimum of 9-months at temperatures sufficient to break down all woody fibers, seeds and leaf structures, free of toxic material at levels that are harmful to plants or humans.
         1) Source material shall be yard waste trimmings blended with other plant or manure-based material designed to produce Compost high in fungal materials.
         2) Compost shall be commercially prepared Compost and meet US Compost Council STA/TMECC criteria or as modified in this section for “Compost as a Landscape Backfill Mix Component”.
         3) Compost shall comply with the following parameters:
            a) Well-composted, stable, and weed-free organic matter produced by composting feedstock.
            b) Feedstock: Limited to leaves.
            c) Bearing USCC's "Seal of Testing Assurance"
            d) Reaction: pH of 5.5 to 8.
            e) Soluble-Salt Concentration: Less than 4 dS/m.
            f) USCC moisture-content requirement is 30 to 60 percent.
            g) Moisture Content: 35 to 55 percent by weight.
            h) USCC organic-matter requirement is 30 to 65 percent.
            i) Organic-Matter Content: 30 to 40 percent dry weight.
            j) USCC particle-size requirement is 3/4 inch (19 mm).
            k) Particle Size: Minimum of 98 percent passing through a 1-inch sieve.
            l) Stability carbon dioxide evolution rate
            m) Solvita maturity test
            n) Physical contaminants (inerts) %, dry weight basis: 10%
            o) Chemical contaminants, mg/kg (ppm): 10ppm
            p) Biological contaminants selected pathogens fecal coliform bacteria, or salmonella, meet or exceed US EPA Class A standard, 40 CFR 503.32(a) level requirements.

b. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.
c. Wood Derivatives: Shredded and composted, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture and free of chips, stones, sticks, soil, or toxic materials.
d. Prohibited Organic Amendments:
   1) Do not use Peat.

2. Inorganic Soil Amendments:
   a. Lime: ASTM C 602, agricultural liming material containing a minimum of 80-percent calcium carbonate equivalent and as follows:
      1) Class: T, with a minimum of 99-percent passing through No. 8 (2.36-mm) sieve and a minimum of 75-percent passing through No. 60 (0.25-mm) sieve.
      2) Class: O, with a minimum of 95-percent passing through No. 8 (2.36-mm) sieve and a minimum of 55-percent passing through No. 60 (0.25-mm) sieve.
   b. Sulfur: Granular, biodegradable, containing a minimum of 90 percent sulfur, and with a minimum of 99 percent passing through No. 6 (3.35-mm) sieve and a maximum of 10 percent passing through No. 40 (0.425-mm) sieve
   c. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20-percent iron and 10-percent sulfur.
   d. Aluminum Sulfate: Commercial grade, unadulterated.
   e. Perlite: Horticultural perlite, soil amendment grade.
   f. Agricultural Gypsum: Minimum 90-percent calcium sulfate, finely ground with 90-percent passing through No. 50 (0.30-mm) sieve.
   g. Diatomaceous Earth: Calcined, 90-percent silica, with approximately 140-percent water absorption capacity by weight.
   h. Zeolities: Mineral clinoptilolite with at least 60-percent water absorption by weight.
3. Fertilizers
   a. Superphosphate: Commercial, phosphate mixture, soluble.
   b. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium.

PART 3 - EXECUTION

3.01 EXAMINATION

A. The Contractor shall examine the site, prior to execution of this scope, noting potential conflicts or changes that may inhibit the work from being installed as indicated on the Drawings.
   1. The Contractor shall notify the Landscape Architect immediately upon discovery of a conflict.

B. Verify that all submittals and test results required herein have been reviewed and accepted by the Landscape Architect.

3.02 PREPARATION

A. Field Quality Control: Protect structure, utilities, pavements, plantings, and other existing site elements from damage caused by the installation of this scope.
   1. Protect adjacent and adjoining areas.
   2. Protect grade stakes set by others until directed to remove them.

B. Erosion and Sedimentation Control: Install stormwater pollution prevention measures to avoid erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

C. Site Conditions: Check existing surface elevations for conformance to survey.
   1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in the excavated area or in the stockpiles of soils.

D. Notify the Landscape Architect of soil placement operations at least 5 business days prior to the beginning of the work.

3.03 INSTALLATION

A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated.

B. Consult with Landscape Architect prior to the final installation allowing the Landscape Architect to verify locations and make adjustments as necessary.

C. Excavation
   1. Excavate soil from designated area(s) to a depth as indicated on the Drawings and stockpile until amended.
      a. Unacceptable Materials: Clean soil of concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
      b. Unsuitable Materials: Clean soil to contain a combined maximum of 8 percent by dry weight of stones, roots, plants, sod, clay lumps, and pockets of coarse sand.

D. Subgrade Preparation
   1. Till subgrade to a minimum depth of 4-inches.
   2. Remove stones larger than 1 ½-inches in DIA as well as sticks, roots, rubbish, and other extraneous matter
   3. Legally dispose of extraneous materials, remove materials from Owner's property.

E. Screening
   1. Pass excavated soil through a 2-inch sieve to remove large materials.

F. Mixing/Blending
   1. Amended Soils: mix existing soil with amendments on-site to produce required planting soil.
      a. Amendments: Apply soil amendments, except compost, and fertilizer, if required, evenly on surface, and thoroughly blend them with excavated soil to produce planting soil.
         1) Mix lime with dry soil before mixing fertilizer.
         2) Mix fertilizer with planting soil no more than seven days before planting.
      b. Lifts: mix excavated soil and amendments in lifts not exceeding 12-inches in loose depth for material compacted by compaction equipment, and not more than 4-inches in loose depth for material compacted by hand-operated tampers.
      c. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or wet.
   2. Manufactured Soils: mix soil off-site to produce required planting soil.

G. Placement
   1. Spread soil to total depth as indicated on the Drawings, but not less than required to meet finish grades after natural settlement.
   2. Apply planting soil in lifts not exceeding 8 inches in loose depth and compacted to meet requirements outlined below:

H. Compaction
   1. Compact each soil lift of planting soil to 82-percent of maximum Standard Proctor density according to ASTM D 698 except where a different compaction value is indicated on Drawings or below.
   2. Note soils will naturally compact. The contractor is responsible for adjusting soil volumes to accommodate the natural compaction of the purchased soil materials based on the manufacturer and blenders specification of the product.
      a. Note that the typical natural compaction soil compaction rates are 15- to 20%.

I. Grading
   1. Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

J. Testing
   1. Engage a qualified testing agency to perform tests and inspections to perform the following tests and inspections:
      a. Compaction: Test planting-soil compaction after placing each lift and at completion using a densitometer or soil-compaction meter calibrated to a reference test value based on laboratory testing according to ASTM D 698. Space tests at no less than one for each 2000 sq. ft. of in-place soil or part thereof.
      b. Performance Testing: For each amended planting-soil type, demonstrating compliance with specified performance requirements. Perform testing according to "Soil-Sampling Requirements" and "Testing Requirements" articles.

3.04 TOLERANCES

A. An acceptable planting is defined as a group of installed healthy plant materials evenly spaced in a straight, uniform row(s) at the time of Final Acceptance by the Landscape Architect.
B. Soil installations shall meet the following criteria as determined by Landscape Architect:
    1. Soils will be considered defective if they do not meet weight, pH, texture, etc.
    2. Soil will be considered defective if it does not pass the final tests and inspections.
        a. Contractor to submit a third-party prepared test and inspection soil report.
        b. Label each sample and test report with the date, location keyed to a site plan or other location system, visible conditions when and where sample was taken, and sampling depth.

3.05 CLEANING

A. The Contractor shall maintain the installed work, related to this scope, as recommended by the associated product and material manufacturers as well as ASTM standards.

3.06 REVIEW

A. The Contractor shall notify the Landscape Architect as key portions of the work is completed. The Landscape Architect will visit the site to review the work.

3.07 MAINTENANCE

A. The Contractor shall maintain the installed work, related to this scope, as recommended by the associated product and material manufacturers as well as ASTM standards.

3.08 PROTECTION

A. After work in this section is complete, the Contractor shall be responsible for protecting work from damage due to subsequent construction activity on the site.
B. Protect areas of in-place soil from additional compaction, disturbance, and contamination. Contractor is responsible for re-establishing grades to specified tolerances were completed or partially completed surface become eroded, rutted, settled, or compacted due to other construction operations or weather conditions. Prohibit the following practices within these areas except as required to perform planting operations:
    1. Storage of construction materials, debris, or excavated material.
    2. Parking vehicles or equipment.
    3. Vehicle and Pedestrian traffic.
    4. Erection of sheds or structures.
    5. Impoundment of water.
    6. Excavation or other digging unless otherwise indicated.
C. Where settling occurs, before Final Acceptance or during the Warranty Period, remove finish surfacing, backfill with additional approved material, compact to specified rates, and restore any disturbed areas to a condition acceptable to the Landscape Architect and Owner.
D. Remove surplus soil and waste material, at no cost to the Owner, including excess subsoil, unsuitable materials, trash, and debris and legally dispose of them off Owner's property unless otherwise indicated.

1. Dispose of excess subsoil and unsuitable materials on-site where directed by Owner.

END OF SECTION

SECTION 32 9200

TURF AND GRASSES

PART 1 - GENERAL

1.01 SUMMARY

A. Section contains specifications for the installation of turf grass lawn areas.
B. Section includes:
   1. Sodding

1.02 RELATED SECTIONS

A. Section 32 9300 – Plants
B. Section 32 9113 – Soil Preparation

1.03 REFERENCES

A. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
   1. Unless otherwise noted, the Referenced Standard Edition is considered the current edition at the time of commencement of construction.
B. American Standard for Nursery Stock (ANSI)
C. American Society for Testing and Materials (ASTM)

1.04 DEFINITIONS

A. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.
B. Finish Grade: Elevation of finished surface of planting soil.
C. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
D. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
E. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
F. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and fertilizers to produce a soil mixture best for plant growth.
G. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or top surface of a fill or backfill before planting soil is placed.

H. Subsoil: All soil beneath the topsoil layer of the soil profile and typified by the lack of organic matter and soil organisms.

I. Surface Soil: Whatever soil is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil, but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.05 SUBMITTALS

A. Action Submittals

1. Installer Qualifications: Documentation demonstrating that the installer has successfully completed turf installation similar in design, material, and extents indicated on this project.
    a. Copy of the installer's license and insurance.
2. Plant Data: Documentation for each turf species specified showing:
    a. Grower name(s), address(es) and contact information.
    b. Name of each turf (scientific and common) that will be purchased from each grower.
    c. Picture of each species that reflect the condition and care of the specimen that will be delivered to the site.

B. Informational Submittals

1. Material Certificates: Certification from the turf grower as well as associated vendors that the purchased turf, fibers, hydroseed mulch, leveling course, and sand fill materials are of good quality according to recognized standards.
    a. Certification of grass seed from seed vendor stating the botanical and common names.
    b. Certification of grass sod from sod vendor, declaring the classification of the sod and stating the botanical, common, cultivar names.
    c. Certification of grass sprig from sprig vendor, stating the botanical, common, cultivar names.
2. Work Schedules: Written schedule stating the date(s) associated with the installation of this scope of work.

C. Closeout Submittals

1. Operations and Maintenance Instructions: Documents from the turf grower and installer, describing the on-going care and protection of turf post construction.
2. Warranties: Copies of associated product, material, and installation warranties.
3. Record Set / As-Built Drawings: Copy of the drawing set that identifies the final location(s) for site elements associated with this scope.

1.06 QUALITY ASSURANCE

A. The Contractor shall maintain an experienced full-time supervisor on site when this scope is in progress. The supervisor shall have successfully completed work similar in design, material, and extent indicated on this project and scope.

B. Pre-installation Meeting: Hold a pre-installation conference, prior to the installation of this scope.
   1. Attendees shall include the Contractor and Landscape Architect.
   2. The meeting agenda will include a review of the product installation requirements, status of site preparation, areas of potential conflicts, and the installer qualifications.
   3. The Contractor shall present a schedule for the installation of this scope as well as a description of the means and methods to be utilized during construction.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Comply with Division 01 Product Requirement Section (01 60 00).
B. Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.
C. Comply with manufacturer's delivery and storage instructions to avoid degrading the materials.
   1. Delivery: Materials will be delivered in the manufacturer's original, unopened, undamaged containers packaging with identification labels intact.
   2. Storage and protection: Materials will be stored and protected such that they are kept free from mud, dirt, and other foreign materials. Do not store or stockpile materials atop exposed dirt or roots located with the tree protection zone.

D. Specific Products Instructions:
   1. Sod: Harvest, deliver, store, and handle sod according to requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in TPI's "Guideline Specifications to Turfgrass Sodding." Deliver sod in time for planting within 24 hours of harvesting. Protect sod from breakage and drying.

1.08 PROJECT SITE CONDITIONS

A. Install all products associated with this scope as recommended by the product manufacturer.
B. Environmental Requirements:
   1. Planting Restrictions: Coordinate installation period with initial maintenance periods to provide required maintenance from date of Final Acceptance. Install turf during the following periods:
      a. Sod Planting: When the average 24-hour on site temperature exceeds 75-degrees F.
   2. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained.
      a. Apply products during favorable weather conditions according to manufacturer's written instructions.
      b. Do not install plant materials during heavy rain or snowfall.
      c. Do not install plant materials over frozen base materials.
      d. Install all products associated with the exterior plants as recommended by the product manufacturer.

1.09 MAINTENANCE

A. Contractor is responsible for product maintenance from purchase until Final Acceptance.
B. Contractor is responsible for protecting work from damage throughout construction.
C. Contractor is expected to clean and/or replace all materials that appear cracked, chipped, marked, vandalized, dirtied, etc. during the construction process.

1.10 WARRANTY

A. Installer agrees to repair or replace products and accessories that fail in materials and/or workmanship within a specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Separation and/or uneven settling of turf sod.
      b. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner.

B. Warranty Periods: From date of Substantial Completion.
   1. Warranty Period for Turf: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Turfgrass Sod: Certified Approved Number 1 Quality/Premium, including limitations on thatch, weeds, diseases, nematodes, and insects, complying with "Specifications for Turfgrass Sod Materials" in TPI's "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted.

2.02 ACCESSORIES

A. Temporary Turf Irrigation:
   1. Maintain and water turf and plant materials upon delivery, prior to installation, once installed, and throughout construction.
   2. Maintain 100-percent irrigation coverage of turf (sodded, seeded, and/or sprigged) and planting areas.
      a. Make minor adjustments necessary to avoid obstructions such as signs and lights.
   3. Ensure that the soil within turf and plant storage nursery be saturated semi-weekly (twice every 7-days).
      a. Turf, planting areas, and planters to receive 2 ½- to 3-inches moisture depth per saturation.
      b. Contractor to provide temporary irrigation using methods approved in writing by the Landscape Architect. The below methods are pre-approved.
         1) Watering may be applied to turf and planting via temporary drip or spray system.
         2) Watering may be applied to turf and planting via watering truck.
         3) Watering may be applied to turf and planting via hand watering.
         4) Watering may be applied to single-trunk trees via tree watering bags.

c. Water measurements may include rainwater documented by the national weather service or pre-approved third party.
d. The scheduled watering must be evenly dispersed within the week. The contractor may not water the plants on consecutive days.

B. Organic Soil Amendments: Refer to specification 329113 – Soil Preparation
C. Inorganic Soil Amendments: Refer to specification 329113 – Soil Preparation
D. Fertilizers:
1. Bonemeal: Commercial, raw or steamed, finely ground; a minimum of 1 percent nitrogen and 10-percent phosphoric acid.
2. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20-percent available phosphoric acid.
3. Commercial Fertilizer: commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50-percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
a. Composition: 1 lb/1000 sq. ft. (0.45 kg/92.9 sq. m) of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
4. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
a. Composition: 20-percent Nitrogen (N), 10-percent Phosphorus (P), and 10-percent Potassium (K), by weight (20-10-10 NPK)

E. Herbicides: Products must be registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application.
1. Do not use herbicides unless authorized in writing by authorities having jurisdiction and the Landscape Architect.

2.03 SUBSTITUTIONS

A. Substitutions that alter the desired look of the design are not encouraged, and (as a rule) will not be allowed if they substantially change the design intent.
B. Plant Species Substitutions: If the Landscape Contractor would like to propose a species substitution, the Contractor must provide documentation showing how the species fulfills the design intent, in shape, colors, growth pattern, and size, provided by the original specified plant species

PART 3 - EXECUTION

3.01 EXAMINATION

A. The Contractor shall examine the site, prior to execution of this scope, noting potential conflicts or changes that may inhibit the work from being installed as indicated on the Drawings.
1. Examine areas to be planted for compliance with requirements and other affecting installation and performance of the Work.

2. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil with a planting area.

B. The Contractor shall notify the Landscape Architect immediately upon discovery of a conflict.

3.02 PREPARATION

A. Field Quality Control: Protect structure, utilities, pavements, plantings, and other existing site elements from damage caused by the installation of this scope.
   1. Protect adjacent and adjoining areas.
   2. Protect grade stakes set by others until directed to remove them.

B. Erosion and Sedimentation Control: Install stormwater pollution prevention measures to avoid erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

C. Site Conditions:
   1. Obtain Landscape Architect's acceptance of finish grading prior to planting/laying turf,
   2. Suspend planting operations during periods of excessive soil moisture.
   3. Uniformly moisten excessively dry soil that is not workable, or which is dusty.
   4. Remove contaminated soils as directed by Landscape Architect and replace with new planting soil, if planting area soils are contaminated by foreign or deleterious materials or liquids.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.03 INSTALLATION

A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated.

B. Consult with Landscape Architect prior to the final installation allowing the Landscape Architect to verify locations and adjust as necessary.

C. Turf Area Preparation
   1. Newly Graded Subgrades: Loosen subgrade to a minimum depth of 6 inches. Remove stones larger than 1-1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
      a. Apply superphosphate fertilizer directly to subgrade before loosening.
      b. Thoroughly blend planting soil off-site before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil.
      c. Spread planting soil to a depth of 6 inches, but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
   2. Unchanged Subgrades: If turf is to be planted in areas unaltered or undisturbed by excavating, grading, or surface-soil stripping operations, prepare surface soil as follows:
      a. Remove existing grass, vegetation, and turf. Do not mix into surface soil.

b. Loosen surface soil to a depth of at least 6 inches. Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 6 inches of soil. Till soil to a homogeneous mixture of fine texture.

1) Apply superphosphate fertilizer directly to surface soil before loosening.

c. Remove stones larger than 1-1/2 inches in any dimension and sticks, roots, trash, and other extraneous matter.

d. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.

3. Finish grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch of finish elevation. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit finish grading to areas that can be planted in the immediate future.

D. Prior to Planting

1. Moisten prepared area before planting if soil is dry.

a. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

2. Restore planting areas, if eroded or otherwise disturbed after grading.

a. Obtain Landscape Architect’s acceptance of final grading.

E. Sodding

1. Lay sod within 24 hours of harvesting.

a. Do not lay sod, if dormant or if ground is frozen or muddy.

1) Lay only green sod.
2) Brown or dormant sod will not be accepted.

2. Lay sod to form a solid mass with tightly fitted joints.

a. Butt ends and sides of sod.
b. Do not stretch or overlap.
c. Stagger sod strips or pads to offset joints in adjacent courses.
d. Avoid damage to subgrade or sod during installation.

3. Tamp and roll lightly to ensure contact with subgrade,

a. Eliminate air pockets and form a smooth surface.
b. Work sifted soil or fine sand into minor cracks between pieces of sod; remove excess to avoid smothering sod and adjacent grass.

4. Lay sod across angle of slopes exceeding 1:3.

a. Anchor sod on slopes exceeding 1:6 with wood pegs or steel staples spaced as recommended by sod manufacturer but not less than 2 anchors per sod strip to prevent slippage.

5. Saturate sod with fine water spray within two hours of planting. During the first week after planting, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches below sod.

6. Ensure that all disturbed areas are returned to pre-construction conditions with new sod.

3.04 TOLERANCES

A. An acceptable uniform stand of grass is defined as a cover of living grass in which gaps larger than 2-inches do not occur at the time of Final Acceptance by the Landscape Architect.
B. Turf installations shall meet the following criteria as determined by Landscape Architect:
   1. Satisfactory Sod Turf: At end of maintenance period, sodded turf must be a healthy, uniform, close stand of established grass free of weeds and surface irregularities.
C. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.
D. The final surface tolerance from grade elevations shall not deviate more than ± ½-inch a 10-foot straightedge.
   1. Check final surface elevations for conformance to drawings.
   2. The surface elevation of turf shall be 1-inch to ½-inch (12.5-mm to 25-mm) above adjacent drainage inlets, concrete collars, or channels. Unless otherwise noted on the Drawings, as part of the stormwater management system.

3.05 CLEANING

A. The Contractor shall maintain the installed work, related to this scope, as recommended by the associated product and material manufacturers as well as ASTM standards.
B. Site debris and excess soil are removed from turf areas.

3.06 REVIEW

A. The Contractor shall notify the Landscape Architect as key portions of the work is completed. The Landscape Architect will visit the site to review the work.

3.07 MAINTENANCE

A. The Contractor shall maintain the installed work, related to this scope, as recommended by the associated product and material manufacturers as well as ASTM standards.
B. General: Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, re-grade, and replant bare or eroded areas and re-mulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.
   1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
   2. In areas where mulch has been disturbed by winds or maintenance operations, add new mulch and anchor as required to prevent displacement.
   3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.
   4. Newly planted turf areas shall be protected from traffic or other use by placing a physical barrier between the area of planting and areas of foot traffic. This protection must be approved by the Landscape Architect before installation. The protective barrier shall be inspected at the end of each working day.

C. Temporary Watering: Install and maintain temporary watering equipment to convey water from sources and keep turf uniformly moist to a depth of 3-inches.
   1. Water turf with fine spray. A minimum amount of rainfall would be two 1-inch rainfalls per week. If more water is needed it is the responsibility of the contractor to provide it.
   2. Schedule: watering to prevent wilting, puddling, erosion, and displacement of seeds, sprigs, or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas. Water must be evenly dispersed on site.
   3. Tests and inspections of temporary irrigation system periodically.
      a. After installation, charge system and test for leaks.
      b. Repair leaks and retest until no leaks exist.
      c. Replace damaged and malfunctioning equipment.
      d. Any irrigation product will be considered defective if it does not pass tests and inspections.

D. Mow grass within construction area until Final Acceptance by Landscape Architect.
   1. All grass clippings shall be removed from property with each mowing.
   2. When grass reaches a height of 3-inches, mow to 2/3 the height, leaving 2- inches remaining.
   3. Maintain a grass height between 2- and 2 ½-inches until Final Acceptance.
   4. Do not cut off more than 40% of grass height in single mowing.
   5. Schedule: Perform mowing approximately weekly (or as required to fulfill the above criteria) for a total of not less than four mows prior to Final Acceptance.

3.08 PROTECTION

A. After work in this section is complete, the Contractor shall be responsible for protecting work from damage due to subsequent construction activity on the site.

END OF SECTION

SECTION 32 9300

PLANTS

PART 1 - GENERAL

1.01 SUMMARY

A. Section contains specifications for the installation of trees, shrubs, ornamental grasses, groundcovers, and other plant materials as well as their accessories.
B. Section includes
   1. Coastal Prairie Seed Mix
   2. Shrubs
   3. Trees
   4. Mulch
   5. Staking and Guying
   6. Temporary Irrigation
   7. Tree Watering Devices

1.02 RELATED SECTIONS

A. Section 01 5639 – Temporary Tree and Plant Protection
B. Section 32 9113 – Soil Preparation
C. Section 32 9200 – Turf and Grasses

1.03 REFERENCES

A. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
   1. Unless otherwise noted, the Referenced Standard Edition is considered the current edition at the time of commencement of construction.
B. American Standard for Nursery Stock (ANSI)
C. American Society for Testing and Materials (ASTM)

1.04 DEFINITIONS

A. Acceptance: Wherever the terms acceptance or accepted are used herein, they mean acceptance of the Landscape Architect in writing.
B. Finished Grade: Elevation of finished surface of planting soil.
C. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

D. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

E. Planting Soil: Existing soil, on-site soil; imported soil; lightweight structural soil, bioretention soil; amended soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

1.05 SUBMITTALS

A. Action Submittals

1. Installer Qualifications: Documentation demonstrating that the installer has successfully completed planting installation similar in design, material, and extents indicated on this project.
    a. Copy of the installer's license and insurance.
2. Plant Data: Documentation for each plant species specified showing:
    a. Nursey name(s), address(es), and contact information
    b. Name of each plant (scientific and common) that will be purchased from each nursery
    c. Picture of each species which generally represents the species that will be delivered to the site.
        1) Trees and large shrubs will require individual photographs of each specimen showing their form and height.
3. Product Data: Documentation for each type of product indicated herein.
    a. Mulch
    b. Staking and Guying
    c. Soil Additives
4. Product Samples: Sealed containers or bags containing each type of mulch and soil additive.

B. Informational Submittals

1. Material Certificates: Certification from the nursery as well as associated vendors that the purchased materials are of good quality according to recognized standards.
2. Seed mix documentation: from seed vendor to include mixture of species stating scientific botanical and common names, percentage of species by weight, and date of packaging. Work Schedules: Written schedule stating in detail the date(s) associated with the installation of this scope of work.

C. Closeout Submittals

1. Operations and Maintenance Instructions: Documents from the material vendor(s) and installers, describing the care and protection of purchased plant materials and accessories.
    a. Maintenance documents should cover one calendar year.
2. Warranties: Copies of associated product, material, and installation warranties.
3. Record Set / As-Built Drawings: Copy of the drawing set that identifies the final location(s) for site elements associated with this scope.

1.06 QUALITY ASSURANCE

A. The Contractor shall maintain an experienced full-time supervisor on site when this scope is in progress. The supervisor shall have successfully completed work similar in design, material, and extent indicated on this project and scope.
B. Provide quality, size, genus, species, and variety of plants indicated that complies with applicable requirements in ANSI Z60.1 - American Standard for Nursery Stock.
C. Pre-installation Meeting: Hold a pre-installation conference, prior to the installation of this scope.
    1. Attendees shall include the Contractor and Landscape Architect.
    2. The meeting agenda will include a review of the product installation requirements, status of site preparation, areas of potential conflicts, and the installer qualifications.
    3. The Contractor shall present a schedule for the installation of this scope as well as a description of the means and methods to be utilized during construction.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Comply with nursery's ordering instructions and lead-time requirements to avoid construction delays.
B. Comply with nursery's delivery and storage instructions to avoid degrading the materials.
    1. Delivery: Materials will be delivered in the manufacturer's original, unopened, undamaged containers packaging with identification labels intact.
    2. Storage and protection: Materials will be stored and protected such that they are kept free from mud, dirt, and other foreign materials. Do not store or stockpile materials atop exposed dirt or roots located with the tree protection zone.

C. Specific Products Instructions:
    1. Plant Harvest:
        a. Do not prune trees and shrubs before delivery.
        b. Protect bark, branches, and root systems from sunscald, drying, sweating, whipping, and other handling and tying damage.
        c. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape.
    2. Plant Delivery:
        a. Provide protective covering of exterior plants during delivery
        b. Do not drop plants during delivery.
        c. To avoid foliage, branch, and trunk damage, handle planting stock by root ball or pot.
        d. Deliver plants only after preparations for planting have been completed and install immediately.
    3. Plant Storage:
        a. If planting is delayed more than six hours after delivery, set plants in shade, protect from weather and mechanical damage, and keep roots moist.
        b. To avoid sun and wind damage, all plants (trees, shrubs, etc.) remain upright (vertical) with their root ball or pot tethered down prior to planting.

c. Any plant materials showing sign of weather and mechanical damage will be rejected.
d. Any plant materials showing sign of weather and mechanical damage will be rejected.

4. Special Considerations:
   a. Balled and Burlap Trees: Dig and ship prior to mid-March or after May (general rule).
      1) Timeframes may vary depending on the plant species and according to leaf-out time. Ship prior to leaf-out to prevent plant shock and to ensure health and quality appearance of the trees.
         a) Do not dig trees that are in the process of leafing out.
         b) Balled and Burlapped trees may also be harvested once they have completed leaf-out.
         c) Shipping after dormancy and during the emergence of new growth, usually between mid-March through June 1, can create the following challenges:
            i. Unhealthy appearance due to loss of new leaves during handling and shipping.
            ii. Increased stress and slower establishment
            iii. Increase in tree care during the first growing season
      2) Once trees are harvested, place them under overhead irrigation in a holding area at the nursery for a period of 2- to 3-weeks to harden off the tender, new growth and acclimate the tree to being above-ground.

1.08 PROJECT SITE CONDITIONS

A. Install all products associated with this scope as recommended by the product manufacturer.
B. Environmental Requirements:
   1. Install all products associated with the exterior plants as recommended by the product manufacturer.
   2. Do not install plant materials during heavy rain or snowfall.
   3. Do not install plant materials over frozen base materials.

1.09 MAINTENANCE

A. Contractor is responsible for plant maintenance from purchase until Final Acceptance.
B. Contractor is responsible for protecting plants from damage throughout construction.
C. Contractor is expected to replace all plants that show signs of die back or damaged during the construction process.

1.10 WARRANTY

A. Installer agrees to repair or replace products and accessories that fail in materials and/or workmanship within a specified warranty period.
   1. Failures include, but are not limited to, the following:

a. Plant materials that do not achieve and maintain at least 80-percent foliage cover over planting area commencing 12-months after planting, through the duration of this warranty.
b. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, neglect by Owner, or incidents that are beyond Contractor's control.
c. Structural failures including plantings falling or blowing over.

2. Remedial actions include, as a minimum, the following:
   a. Remove dead plants and replace them unless required to plant in the succeeding planting season.
      1) Removal preformed monthly.
   b. Replace plants that are more than 25-percent dead or in an unhealthy condition at end of warranty period.
   c. A limit of one replacement for each plant will be required except for losses or replacements due to failure to comply with requirements.
   d. Provide extended warranty period for replaced plants equal to original warranty period, for replaced plant material.
      1) Replaced plants must be documented in writing as well as before and after photography submitted to the owner in a monthly report.

B. Warranty Periods: From date of substantial completion.
   1. Warranty Period for Trees and Shrubs: One year from date of final acceptance.
   2. Warranty Period for Seed Mix: Two years from date of final acceptance.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Plants
   1. Coastal Prairie Seed mix:
      a. To be of southern genetics and contain the species as listed below. To be seeded at a rate of 10 pounds per acre.
         1) American basket flower
         2) Broomsedge Bluestem
         3) Eastern Gama grass
         4) Illinois bundleflower
         5) Lemon mint
         6) Marsh elder
         7) Plains coreopsis
         8) Purpletop
         9) Sand lovegrass
         10) Swamp milkweed
         11) Waco Indiangrass
         12) Big bluestem

13) Clasping coneflower
14) Florida paspalum
15) Indian blanket
16) Little bluestem
17) Maximilian sunflower
18) Prairie wildrye
19) Rattlesnake master
20) Sideoats grama
21) Switchgrass
22) Yellow coneflower
23) Cowpen daisy
24) Gayfeather
25) Indiangrass
26) Little bluestem gulf states
27) Partridge pea
28) Purple coneflower
29) Red lovegrass
30) Sleepy daisy
31) Tall dropseed
32) Bluebonnet
33) Cutleaf evening primrose
34) Golden wave
35) Lanceleaf coreopsis
36) Purple lovegrass
37) Sand dropseed
38) Standing cypress
39) Virginia wildrye
40) Winecup
41) Pink evening primprose

2. Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant List, Plant Schedule, or Plant Legend indicated on Drawings
3. Plant materials must comply with ANSI Z60.1
   a. Provide healthy root systems developed by transplanting and/or root pruning.
   b. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf
      1) Furnish plants that are free of disease and pests, including their eggs and larvae.
      2) Furnish plants that are free of defects such as knots, sun scald, injuries, abrasions, and disfigurement.
      3) Furnish plants that are free of voluntary and/or weed plant materials,
   c. Trees and Large Shrubs
      1) Trees and large shrubs shall be single stem unless noted otherwise on drawings.

a) Multi-stem trees and shrubs (when specified in the drawings) shall have a minimum of 3-trunks and a maximum of 5-trunks unless noted otherwise on drawings.

2) Trees shall have a clearly defined dominant vertical central leader as well as a 5-foot minimum crotch height unless noted otherwise on drawings.
3) Large Shrubs shall be grown full with a 1-foot minimum crotch height unless noted otherwise on drawings.
4) Provide trees and shrubs with root balls measured from top of root ball, which begins at root flare according to ANSI Z60.1. Root flare shall be visible before and after planting.
5) All trees and large shrubs shall be field grown and delivered to the site B&B unless noted otherwise.
   a) Contractor shall verify plant material are accessible to and properly fit within constructed planting area prior to purchase. Notify Landscape Architect if plant materials exceed site limitation.
   b) Note that these are generalized figures. Specific plant material weight may vary based on species. Consult the nursery for precise measurements.

d. Shrubs and Ornamental Grasses

1) Shrubs and ornamental grasses shall be container grown unless noted otherwise on drawings.
   a) Contractor shall verify plant material are accessible to and properly fit within constructed planting area prior to purchase. Notify Landscape Architect if plant materials exceed side limitation.
   b) Note that these are generalized figures. Specific plant material weight may vary based on species. Consult the nursery for precise measurements.

e. Groundcovers

1) Groundcovers shall be container grown unless noted otherwise on drawings.
   a) Contractor shall verify plant material are accessible to and properly fit within constructed planting area prior to purchase. Notify Landscape Architect if plant materials exceed side limitation.
   b) Note that these are generalized figures. Specific plant material weight may vary based on species. Consult the nursery for precise measurements.

4. Refer to the Construction Drawings for further detail on size, form, staking, and pruning of specific plant species.

B. Organic Mulch:

1. Pine straw (pine needles)
   a. Regionally sourced, Louisiana pine, whole or shredded, sifted free of whole or partial cones
2. Hardwood Chips

a. Regionally sourced, twice shredded, washed, free of fines and seeds
b. Cypress mulch is not allowed.

C. Burlap:
1. Vigoro, or approved equal
a. 100% Natural burlap landscape fabric
b. Synthetic burlap is not allowed.

2.02 ACCESSORIES

A. Staking and Guying:
1. T-post stakes, or approved equal
a. 6-feet length steel material with forest green powder coat finish
1) Product to be removed after planting material Warranty Period.
2. Arbor Tie guy wires, or approved equal
a. bright orange or yellow ribbon or flags to run length of guy wire throughout the remainder of construction.
1) Product to be removed after planting material Warranty Period.

B. Tree Watering Devices:
1. Tree Gator products, TreeDiaper products, or approved equal
a. Slow-release watering device, product manufactured for drip irrigation of plants and emptying its water contents over an extended time period
b. Materials manufactured from UV-light-stabilized nylon-reinforced polyethylene sheet, PVC, or HDPE plastic.
1) Product to be utilized when irrigation system is not operating.
2) Product to be removed after planting material Warranty Period.

C. Landscape Edging: Refer to specification 32 9400 – Landscape Accessories

2.03 ADDITIVES

A. Soil Amendments: Refer to Soil Amendment sections of specification 32 9113 – Soil Preparation.

2.04 SUBSTITUTIONS

A. Substitutions that alter the desired look of the design are not encouraged, and (generally) will not be allowed if they substantially change the design intent.
B. When submitting an alternative product or material:
1. The Contractor shall provide complete data showing compliance with the Contract Documents.
2. The Contractor represents that she/he:
a. Has investigated the proposed substitution and found that it is of the same or better quality, level, capacity, function, or appearance than the specified product.

b. Has conducted analysis demonstrating the substituted product fully integrates with other specified products and equipment.
c. Will coordinate the installation and make all modifications to the work which may be required for complete installation.
d. Will bear all costs resulting from necessary changes caused by the substitution.

3. The Landscape Architect will determine acceptance of proposed substitution, and the Landscape Architect will notify the Contractor of the product's acceptance or rejection.

C. Plant Species Substitutions: If the Landscape Contractor would like to propose a species substitution, the Contractor must provide documentation showing how the species fulfills the design intent, in shape, colors, growth pattern, and size, provided by the original specified plant species

PART 3 - EXECUTION

3.01 EXAMINATION

A. The Contractor shall examine the site, prior to execution of this scope, noting potential conflicts or changes that may inhibit the work from being installed as indicated on the Drawings.
1. Examine areas to be planted for compliance with requirements and other affecting installation and performance of the Work.
2. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil with a planting area.

B. Prior to purchase of planting materials and accessories the Contractor must field verify material quantities based on built work and the specified spacing.
1. The Owner and Landscape Architect is not responsible for the purchase and/or return of excess materials.

C. Prior to the purchase of planting materials and accessories the Contractor must field verify material sizes are well within site accessibility and planting space limitations based on built work and the specified spacing.
1. The Owner and Landscape Architect is not responsible for the purchase and/or return of oversize materials.

D. The Contractor shall notify the Landscape Architect immediately upon discovery of a conflict.

3.02 PREPARATION

A. Field Quality Control: Protect structure, utilities, pavements, plantings, and other existing site elements from damage caused by the installation of this scope.
1. Protect adjacent and adjoining areas.
2. Protect grade stakes set by others until directed to remove them.

B. Erosion and Sedimentation Control: Install stormwater pollution prevention measures to avoid erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
C. Site Conditions: Check existing surface elevations for conformance to survey.
    1. Obtain Landscape Architect's acceptance of finish grading prior to planting/laying turf,
    2. Suspend planting operations during periods of excessive soil moisture.
    3. Uniformly moisten excessively dry soil that is not workable, or which is dusty.
    4. Remove contaminated soils as directed by Landscape Architect and replace with new planting soil, if planting area soils are contaminated by foreign or deleterious materials or liquids.
D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.03 INSTALLATION

A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated.
B. Consult with Landscape Architect prior to the final installation allowing the Landscape Architect to verify locations and adjust as necessary.
C. Excavation
    1. Pits and Trenches: By hand or machine excavate individual pits or in-line trenches to plant the specified plant material.
        a. Balled and Burlapped Stock: Excavate a pit at least 12-inches wider than rootball and deep enough to accommodate vertical height of the rootball.
            1) Do not excavate deeper than depth of the root ball or pot, measured from the root flare to the bottom of the root ball of soil level within the pot.
        b. Container-Grown Stocks: Excavate a pit at least three times as wide as ball or pot diameter and deep enough to accommodate vertical height of the rootball.
            1) Do not excavate deeper than depth of the root ball or pot, measured from the root flare to the bottom of the root ball of soil level within the pot.
    2. Pit and Trench Sides: Excavate circular planting pits with sides sloping inward at a 45-degree angle. Score sloped sides of pit/trench so that they are coarse textured, not smooth.
        a. Excavations with vertical sides are unacceptable.
    3. Pit and Trench Base: Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb the base.
        a. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.
D. Planting
    1. Seed Mix:
        a. Sed using a broadcast machine. Do not hand disperse seeds.
        b. Do not seed when wind speeds exceed 5 MPH.

c. Evenly distribute seeds at the rates indicated in this Specification.
d. After broadcasting, lighting hand rake the dispersed seed into the soil to ensure soil cover. Contractor shall not push seed into soil. Raking shall only lightly cover seeds with the soil mix.
e. Protect seeded areas by spreading straw mulch uniformly over the seeded areas. Soil must be 50% visible through the straw mulch.
    1) Do not install straw mulch with a blower or by any means that will disperse the newly seeded soil.

2. Excess Soil Removal: Verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil by hand in a level manner from the root ball to where the top-most root emerges from the trunk.
    a. After removing soil to expose the root flare, verify that root ball still meets size requirements.
3. Pruning: Plant material may only be pruned by the nursery at a minimum of three months prior to delivery. This will help ensure all plants are in good health when delivered to the site.
    a. The landscape architect reserves the right to reject plant material based on issues related to the form, structure, and health of a plant's roots and branches.
    b. Once delivered, branches may not be pruned prior to installation.
    c. Stem girdling roots and kinked roots must be properly pruned by a licensed arborist prior to installation.
        1) Notify the Landscape Architect prior to an arborist correctively pruning roots and/or branch.
        2) Remove injured portions by cutting cleanly; do not break.
    d. Injured roots and/or branches must be properly pruned by a licensed arborist prior to installation.
        1) Notify the Landscape Architect prior to an arborist removing injured roots and/or branches.
        2) Remove injured portions by cutting cleanly; do not break.
4. Placement: Set each plant plumb and in center of planting pit or trench with root flare 1-inch above adjacent finish grades.
    a. Plant materials must be offset from hardscape.
        1) Trees may not be placed within 4-feet of hardscape.
        2) Shrubs and ornamental grasses may not be placed within 12-inches of hardscape or within half the distances of their specified spacing whichever is greater.
        3) Groundcovers may not be placed within 6-inches of hardscape.
    b. Balled and Burlapped Stock: After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove as much of the wire basket and burlap as possible without compromising the structural integrity of the football.
        1) Contractor must remove a minimum 1/3 of both the burlap and wire basket.

a) No continuous cords of wire or areas of burlap longer than 12-inches.
b) No continuous cords of wire or areas of burlap longer than 6-inches may be present with the top 12-inches of the rootball.

2) Remove pallets, if any, before setting.
3) Do not use planting stock if root ball is cracked or broken before or during planting operation.

c. Container-Grown Stock:

1) Plastic: Carefully remove root ball from container without damaging root ball or plant.
2) Fabric: Carefully remove root ball from fabric bag without damaging root ball or plant.

a) Do not use planting stock if root ball is cracked or broken before or during planting operation.

5. Backfill and Watering: Replace soil around rootball in layers, tamping to settle soil and eliminate voids and air pockets. When the planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.

a. Fill in excavated trench with specified soil mix as indicated on the Drawings.

6. Soil Additives: Place planting tablets equally distributed around each tree planting pit when pit is approximately one-half filled.

a. Place two tablets per tree beside the rootball about 1-inch from root tips.

1) Do not place tablets in bottom of the hole.

7. Backfill, continued: Continue backfilling process.
8. Watering continued: Irrigate plants and soil after placing the final layer of soil.

E. Staking and Guying

1. Staking the trees and hedges shall be done immediately after planting.

a. Where commercially manufactured stakes are used, they shall be installed as per the manufacturer's instructions.
b. Stakes shall not penetrate the ball of earth moved with the tree. Stakes shall penetrate existing soil below tree pit.
c. Three stakes shall be used for each tree. One stake may be used per large shrub when the shrub is part of a densely planted linear hedge row.
d. Trees and hedges shall stand plumb, vertical after staking.

1) The Contractor is responsible for preventing plants from falling or being blown over.
2) Stakes shall be of sufficient strength to maintain the tree in an upright position that overcomes the circumstances that initiated the need for staking (i.e., strong winds, localized flooding, human tampering, etc.).

a) The Contractor must straighten or replant all plants which are altered or damaged due to a lack of staking.

b) During the Warranty Period, plants blown over by high winds shall not be a cause of additional expense to the Owner but shall be the financial responsibility of the Contractor.

2. Stakes and guying shall be discretely located away from pedestrian areas.
   a. Guy wires shall be flagged, and the flags shall remain in place throughout construction until Substantial Completion.
   b. Flags shall continue to remain in place until the end of the warranty period, unless specified otherwise by the Owner.
3. Stakes and guying shall be removed by the Contractor at the end of the Warranty Period.
   a. Stakes may not be left in place longer than one calendar year after Substantial Completion.
   b. The landscape Architect must be present during the removal of stakes.
   c. Any tree that is not stable at the end of this time shall be rejected.
      1) Alternatively, the Contractor, Owner, and Landscape Architect may agree to leave the stakes in place until the end of the next growing season. At which point the Contractor must remove the stake, and unstable trees will be replaced by the Contractor.

F. Post-Planting Pruning and Hedging
1. Contractor to ensure the Landscape Architect is present during all tree, shrub, and hedge installation as well as all post installation pruning sessions.
   a. Refer to the Construction Drawings for further detail on pruning plants, specifically trees and hedges.
2. Contractor to ensure that the pruning and hedging of installed plant material be conducted by the following professions. These professionals must also have a firm knowledge of the design intent.
   a. Trees by a Louisiana licensed arborist
   b. Shrubs and hedges by a Louisiana licensed landscape horticulturist.
   c. Grasses and ground covers by a Louisiana licensed landscape horticulturist.
3. Prune, thin, and shape trees, shrubs, and vines according to standard professional horticultural and arboricultural practices. Unless otherwise indicated by Landscape Architect.
   a. Do not cut tree leaders.
   b. Do not prune for shape, initially.
   c. Initially, only remove only dead, dying, or broken branches.
   d. Hedge shrubs according to height and shape requirements stated in the Construction Drawings.
   e. Prune trees to retain the natural character of plants.
   f. Do not apply pruning paint to wounds.

G. Mulch Placement
1. Mulch planting areas and other areas indicated in the Construction Drawings.
   a. Existing Tree Areas: Leave specified Tree Protection Mulch in place.

1) Refresh mulch as needed to ensure there is a 3-inch average thickness throughout.
2) Do not place mulch within 12-inches of trunks or stems.
3) Refer to specification 01 56 39 – Temporary tree and plant protection

b. Turf Areas: Apply organic mulch ring of 3-inch average thickness, with 36-inch radius around tree trunks and/or shrub stems.

1) Do not place mulch within 6-inches of woody trunks or stems.

c. Planting Areas: Apply 3-inch average thickness of organic mulch over whole surface of planting area, and finish level with adjacent finish grades.

1) Do not place mulch within 3-inches of woody trunks or stems.

H. Slow-Release Watering Device

1. Bagging of trees and hedges shall be done immediately after planting.
   a. Where commercially manufactured devices are used, they shall be installed as per the manufacturer's instructions.
   b. Provide one device for each tree.

3.04 TOLERANCES

A. An acceptable planting is defined as a group of installed healthy plant materials evenly spaced in a straight, uniform row(s) at the time of Final Acceptance by the Landscape Architect.
B. Planting installations shall meet the following criteria as determined by Landscape Architect:
   1. Plant materials shall meet the specified species and size.
      a. Planting of same species and size match aesthetically.
   2. Plants are free of pests and weeds.
   3. Plants are free of uncorrected structural and superficial damage.
   4. Plants are located at their specified elevation.
   5. Plants are correctly staked vertical and mulched.
   6. Watering devices are properly installed.

3.05 CLEANING

A. The Contractor shall maintain the installed work, related to this scope, as recommended by the associated product and material manufacturers as well as ASTM standards.
B. Site debris and excess soil are removed from planting areas as well as planting materials.

3.06 REVIEW

A. The Contractor shall notify the Landscape Architect as key portions of the work is completed. The Landscape Architect will visit the site to review the work.

3.07 MAINTENANCE

A. The Contractor shall maintain the installed work, related to this scope, as recommended by the associated product and material manufacturers as well as ASTM standards.

B. Protect plants from damage due to landscape operations and operations of other contractors and trades.
   1. Maintain protection during installation and maintenance periods.
   2. Treat, repair, or replace damaged plantings.

C. Maintenance begins immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:
   1. Provide maintenance by skilled employees of landscape Installer. Begin Maintenance Period for Trees and Shrubs: 12 months from date of Final Acceptance.

D. Maintain plantings by pruning, cultivating, watering, weeding, mulching, restoring planting saucers, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings.
   1. Applying pesticides, herbicides, and fertilizers to any of the planting areas is prohibited.

E. Subsidence: Fill in, as necessary, soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.

F. Temporary Watering: Install and maintain temporary watering equipment to convey water from sources and keep turf uniformly moist to a depth of 3-inches.
   1. Water turf with fine spray. A minimum amount of rainfall would be two 1-inch rainfalls per week. If more water is needed it is the responsibility of the contractor to provide it.
   2. Schedule: watering to prevent wilting, puddling, erosion, and displacement of seeds, or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas. Water must be evenly dispersed on site.
   3. Tests and inspections of temporary irrigation system periodically.
      a. After installation, charge system and test for leaks.
      b. Repair leaks and retest until no leaks exist.
      c. Replace damaged and malfunctioning equipment.
      d. Any irrigation product will be considered defective if it does not pass tests and inspections.

3.08 PROTECTION

A. After work in this section is complete, the Contractor shall be responsible for protecting work from damage due to subsequent construction activity on the site.

END OF SECTION

SECTION 32 94 00

PLANTING ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

A. Section contains specifications for installation of linear barriers associated with site planting and paving edges.
B. Section includes
   1. Landscape Edging

1.02 RELATED SECTIONS

A. Section 32 9135 – Soil Preparation
B. Section 32 9200 – Turf and Grasses
C. Section 32 9300 – Plants

1.03 REFERENCES

A. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
   1. Unless otherwise noted, the Referenced Standard Edition is considered the current edition at the time of commencement of construction.

B. American Society for Testing and Materials (ASTM)
   1. ASTM D 256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.
   2. ASTM D 638 - Standard Test Method for Tensile Properties of Plastics.
   3. ASTM D 785 - Standard Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials.
   4. ASTM D 790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

1.04 DEFINITIONS

A. Finished Grade: Elevation of finished surface of planting soil.
B. Planting Soil: Existing soil, on-site soil; imported soil; lightweight structural soil, bioretention soil; amended soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
C. Subgrade: The soil surface on which aggregate base or cement-treated base is placed.

1.05 SUBMITTALS

A. Action Submittals

1. Installer Qualifications: Documentation demonstrating that the installer has successfully completed landscape edging installations similar in design, material, and extents indicated on this project.
    a. Copy of the installer's license and insurance.
    b. A written document that includes project name and location, as well as the type and quantity of edge or root barrier panels furnished.
2. Product Data: Documentation for each type of product indicated herein.
3. Product Samples: Sealed packages containing each type of edging demonstrating the finish, and color, and materials specified.

B. Informational Submittals
1. Material Certificates: Certification from the manufacturer as well as associated vendors that the purchased materials are of good quality according to recognized standards.
    a. Documentation must also state that the materials comply with specified requirements and are suitable for intended application.

C. Closeout Submittals
1. Operations and Maintenance Instructions: Documents from the material vendor, describing the care and protection of this scope.
2. Warranties: Copies of associated product, material, and installation warranties.
3. Record Set / As-Built Drawings: Copy of the drawing set that identifies the final location(s) for site elements associated with this scope.

1.06 QUALITY ASSURANCE

A. The Contractor shall maintain an experienced full-time supervisor on site when this scope is in progress. The supervisor shall have successfully completed work similar in design, material, and extent indicated on this project and scope.
B. Pre-installation Meeting: Hold a pre-installation conference, prior to the installation of this scope.
1. Attendees shall include the Contractor and Landscape Architect.
2. The meeting agenda will include a review of the product installation requirements, status of site preparation, areas of potential conflicts, and the installer qualifications.
3. The Contractor shall present a schedule for the installation of this scope as well as a description of the means and methods to be utilized during construction.

C. Mock-Ups: Mock-up will demonstrate the look of the finished system; therefore, it will include examples of alignment, curves, connections, and depth to demonstrate compliance with the specified craftsmanship standards.
1. Refer to INSTALLATION and FIELD QUALITY ASSURANCE sections under Part Three - Execution in this specification.
2. Mock-ups will be used as the standard by which the work will be judged.
3. Mock-ups may be retained as part of finished work.
    a. Retention of the mock-up is subject to Landscape Architect's acceptance.
    b. If mock-up is not retained, remove and properly recycle or dispose of the mock-up materials.

4. Mock-up will be at least 20-feet in Length.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.
B. Comply with manufacturer's delivery and storage instructions to avoid degrading the materials.
   1. Delivery: Materials will be delivered in the manufacturer's original, unopened, undamaged containers packaging with identification labels intact.
   2. Storage and protection: Materials will be stored and protected such that they are kept free from mud, dirt, and other foreign materials. Do not store or stockpile materials atop exposed dirt or roots located with the tree protection zone.
C. Specific Products Instructions:
   1. Steel Landscape Edging: Leave edging in wrappings until time of installation to avoid scratching finish.

1.08 PROJECT SITE CONDITIONS

A. Install all products associated with this scope as recommended by the product manufacturer.
B. Environmental Requirements:
   1. Install all products associated with plants and edging as recommended by the product manufacturer.
   2. Weather Limitations: Proceed with planting and edging only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained.
      a. Apply products during favorable weather conditions according to manufacturer's written instructions.
      b. During Cold Weather: Do not use frozen materials.
         1) Do not use materials mixed or coated with ice or frost.
         2) Do not build on frozen Work.
      c. During Wet Weather: Do not build on wet, saturated, or muddy subgrade.

1.09 MAINTENANCE

A. Contractor is responsible for product maintenance from purchase until Final Acceptance.
B. Contractor is responsible for protecting work from damage throughout construction.
C. Contractor is expected to clean and/or replace all materials that appear cracked, chipped, marked, vandalized, dirtied, etc. during the construction process.

1.10 WARRANTY

A. Installer agrees to repair or replace products and accessories that fail in materials and/or workmanship within a specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Clear signs of a breach, rips, cracks, tears, etc.

b. Erosion or washout of edging related to wind, water, or standard use.

B. Warranty Periods: From date of Substantial Completion.

1. Warranty Period for steel edging: One-year from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 LANDSCAPE EDGING

A. Basis-of-Design Product(s): Subject to compliance with requirements, provide the product indicated herein or submit an equal alternative product for approval:

1. Landscape Edging A:
   a. Manufacturer(s): COL-MET
   b. Material: Steel
      1) Thickness: 14-guage
   c. Finish: Powder Coated
      1) Color: Green
   d. Description: Linear panels with interlocking system integrated into each panel. Landscape edging as a border anywhere separation and definition is required, specifically between plantings, mulch areas, pavers, and/or aggregate paving.
      1) Secured with 16-inch Length min. stakes.
      2) Four stake slots per panel.
      3) Panels connect without offset or double thickness at the joints.

2.02 MATERIALS

A. Metal

1. Steel: 50% minimum of product to me made from recycled materials

2.03 ACCESSORIES

A. Landscape Edging: Contractor to use edging accessories to ensure edging has a clean, professionally finished look. Accessories must match the landscape edging specified.

1. Extension Sections: Used to avoid cutting edging panels or extend edging. Used to form measured angles within a line of landscape edging.
   a. Length: 24-inch or 48-inch
2. End Piece: Used to terminate a linear run of landscape edging.
   a. Description: Squared-off edge with two stakes attached.
3. Specialty Stakes
   a. End Stake: Used to cover the cut off edge and secure the edging in place at that point when a full-sized panel must be cut, and an extension section will not suffice.
   b. Corner Stakes: Used to join two pieces of cut edging to make a perfect 90-degree angle

c. Splicing Stake: Used to attach two pieces of cut off edging and cover the gap where grade changes are made.

4. Tree Ring Sections: Do not use unless authorized in writing by authorities having jurisdiction and the Landscape Architect. Vinyl Trim Cap (if applicable): Used to Provide a plastic cover on the top of the edging for high pedestrian traffic areas.

2.04 SUBSTITUTIONS

A. Substitutions that alter the desired look of the design are not encouraged, and (as a general rule) will not be allowed if they substantially change the design intent.
B. When submitting an alternative product or material:
   1. The Contractor shall provide complete data showing compliance with the Contract Documents.
   2. The Contractor represents that she/he:
      a. Has investigated the proposed substitution and found that it is of the same or better quality, level, capacity, function, or appearance than the specified product.
      b. Has conducted analysis demonstrating the substituted product fully integrates with other specified products and equipment.
      c. Will coordinate the installation and make all modifications to the work which may be required for complete installation.
      d. Will bear all costs resulting from necessary changes caused by the substitution.
   3. The Landscape Architect will determine acceptance of proposed substitution, and the Landscape Architect will notify the Contractor of the product's acceptance or rejection.

PART 3 - EXECUTION

3.01 EXAMINATION

A. The Contractor shall examine the site, prior to execution of this scope, noting potential conflicts or changes that may inhibit the work from being installed as indicated on the Drawings.
   1. The Contractor shall notify the Landscape Architect immediately upon discovery of a conflict.

3.02 PREPARATION

A. Field Quality Control: Protect structure, utilities, pavements, plantings, and other existing site elements from damage caused by the installation of this scope.
   1. Protect adjacent and adjoining areas.
   2. Protect grade stakes set by others until directed to remove them.
B. Erosion and Sedimentation Control: Install stormwater pollution prevention measures to avoid erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
C. Site Conditions: Check existing surface elevations for conformance to survey.

3.03 INSTALLATION

A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated.
B. Consult with Landscape Architect prior to the final installation allowing the Landscape Architect to verify locations and adjust as necessary.
C. Landscape Edging
    1. Check to ensure that all underground lines, irrigation hoses, and other cables are installed below the maximum depth of the edging system.
    2. Define the area using string, paint, or other means.
    3. Use a spade or mechanical trencher to cut a trench
        a. Trench depth to be defined so that the top of edging will not exceed ½" above finished grade.
    4. Install edging at locations indicated on the Drawings.
        a. Use a minimum of 6 stakes per panel of edging.
    5. Back fill on both sides of the edging during installation leaving no more than 2 panels are left unsupported at one time.
    6. Compact fill along edging ensuring edging is secure.

3.04 TOLERANCES

A. Edging installations shall meet the following criteria as determined by Landscape Architect:
    1. Top of edging shell be no more than ½-inch above finished grade.

3.05 CLEANING

A. The Contractor shall maintain the installed work, related to this scope, as recommended by the associated product and material manufacturers as well as ASTM standards.

3.06 REVIEW

A. The Contractor shall notify the Landscape Architect as key portions of the work is completed. The Landscape Architect will visit the site to review the work.
B. Tolerances:

3.07 MAINTENANCE

A. The Contractor shall maintain the installed work, related to this scope, as recommended by the associated product and material manufacturers as well as ASTM standards.

3.08 PROTECTION

A. After work in this section is complete, the Contractor shall be responsible for protecting work from damage due to subsequent construction activity on the site.

END OF SECTION