Project Manual

LSU Solicitation Number RFQ-0000002786

Furnish Labor and Materials for

Renovations to the A.C. Buchanan Building LSUA
807 Jackson Street, Alexandria, LA 71301

Louisiana State University at Alexandria
Hwy 71 S
Alexandria, LA 71302

April 2026

Ashe Broussard Weinzettle Architects, LLP
(Architect's Project Number 2024.33)

ASHE | BROUSSARD | WEINZETTLE
ARCHITECTS
301 JACKSON STREET | SUITE 205
ALEXANDRIA, LOUISIANA 71301
P 318.473.0252 | F 318.442.6007
jimweinzettle@abwarchitects.com

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22 05 17	Plumbing Access Doors	2 pages
22 05 23	Valves, Strainers and Vents	6 pages
22 07 19	Pipe Insulation for Plumbing and HVAC	6 pages
22 11 16	Domestic Water Piping and Appurtenances	3 pages
22 13 16	Soil, Waste, & Sanitary Drain Piping, Vent Piping and Appurtenances	4 pages
22 20 00	Plumbing Pipe and Pipe Fittings	7 pages
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23 31 13	DUCTWORK	11 Pages
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DIVISION 26 – ELECTRICAL

26 00 00	Basic Electrical Materials and Methods	4 pages

26 20 00 Interior Distribution System 10 pages
26 51 00 Interior Lighting 3 pages

DIVISION 27 –COMMUNICATIONS
27 10 00 Building Telecommunications Cabling System 9 pages

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28 31 00 Interior Fire Detection & Alarm System 10 pages

DIVISION 31 – EARTHWORK none included

DIVISION 32 – EXTERIOR IMPROVEMENTS
32 13 13 Concrete Paving 11 pages
32 11 23 Aggregate Base Course 6 pages

DIVISION 33 – UTILITIES none included

ADVERTISEMENT FOR BIDS

Bids will be received by the Office of Purchasing, Room 213 Thomas Boyd Hall, Louisiana State University and Agricultural and Mechanical College 70803 until **11:00 AM on Thursday, June 4, 2026.**

**** Refer to www.centerlinebidconnect.com for bid submission instructions. All bids must be submitted via email to lsubids@lsu.edu ****

ANY PERSON REQUIRING SPECIAL ACCOMMODATIONS SHALL NOTIFY LOUISIANA STATE UNIVERSITY, OFFICE OF PURCHASING OF THE TYPE(S) OF ACCOMMODATION REQUIRED NOT LESS THAN SEVEN (7) DAYS BEFORE THE BID OPENING.

FOR: **Furnish Labor and Materials for Renovations to the A.C. Buchanan Building LSUA**

LSU SOLICITATION NUMBER: RFQ-0000002786

Complete Bidding Documents for this project may be obtained from: **www.centerlinebidconnect.com**. Printed copies are not available from the Designer, but arrangements can be made to obtain them through most reprographic firms.

Contractors unable to access bidding documents at **www.centerlinebidconnect.com** should contact

Ashe, Broussard, Weinzettle Architects
301 Jackson Street, Suite 205
Alexandria, LA 71301
Phone: 318-473-0252

All bids must be accompanied by bid security equal to five percent (5%) of the sum of the base bid and all alternates, and must be in the form of a certified check, cashier's check or Bid Bond Form written by a surety company licensed to do business in Louisiana, signed by the surety's agency or attorney-in-fact. Surety must be listed on the current U.S. Department of the Treasury Financial Management Service list of approved bonding companies as approved for an amount equal to or greater than the amount for which it obligates itself in the Bond, or must be a Louisiana domiciled insurance company with at least an A- rating in the latest printing of the A.M. Best's Key Rating Guide. If surety qualifies by virtue of its Best's listing, the amount of the Bond may not exceed ten percent of policyholders' surplus as shown in the latest A.M. Best's Key Rating Guide. The Bid Bond shall be in favor of the Louisiana State University and Agricultural and Mechanical College, and shall be accompanied by appropriate power of attorney. No Bid Bond indicating an obligation of less than five percent (5%) by any method is acceptable.

The successful Bidder shall be required to furnish a Performance and Payment Bond written by a company licensed to do business in Louisiana, in an amount equal to 100% of the Contract amount. Surety must be listed currently on the U.S. Department of Treasury Financial management Service List (Treasury List) as approved for an amount equal to or greater than the contract amount, or must be an insurance company domiciled in Louisiana or owned by Louisiana residents. If surety is qualified other than by listing on the Treasury list, the contract amount may not exceed fifteen percent of policyholders' surplus as shown by surety's most recent financial statements filed with the Louisiana Department of Insurance and may not exceed the amount of $500,000. However, a Louisiana domiciled insurance company with at least an A- rating in the latest printing of the A.M. Best's Key Rating Guide shall not be subject to the $500,000 limitation, provided that the contract amount does not exceed ten percent of policyholders' surplus as shown in the latest A.M.

Best's Key Rating Guide nor fifteen percent of policyholder's surplus as shown by surety's most recent financial statements filed with the Louisiana Department of Insurance. The Bond shall be signed by the surety's agent or attorney-in-fact.

A PRE-BID CONFERENCE WILL BE HELD

10:00 AM, Monday, May 18, 2026
LSU Alexandria, Live Oaks Conference Room,
195 Middleton Drive, Alexandria, LA 71302

Bids shall be accepted from Contractors who are licensed under LA. R.S. 37:2150-2163 for the classification of **BUILDING CONSTRUCTION.** Bidder is required to comply with provisions and requirements of LA R.S. 38:2212 (A)(1)(c). No bid may be withdrawn for a period of thirty (30) days after receipt of bids, except under the provisions of LA. R.S. 38:2214.

The Owner reserves the right to reject any and all bids for just cause. In accordance with La. R.S. 38:2212 (A)(1)(b), the provisions and requirements of this Section, those stated in the advertisement for bids, and those required on the bid form shall not be considered as informalities and shall not be waived by any public entity.

When this project is financed either partially or entirely with State Bonds or federal funds, the award of this Contract is contingent upon the granting of lines of credit, the sale of bonds by the Bond Commission or the commitment of federal funds. The University shall incur no obligation to the Contractor until the Contract Between Owner and Contractor is fully executed.

AD RUN DATES: May 1, May 8, May 15, 2026

LOUISIANA UNIFORM PUBLIC WORK BID FORM

TO: Office of Procurement
213 Thomas Boyd Hall
Louisiana State University
Baton Rouge, LA 70803

BID FOR: Renovations to the A.C. Buchanan Building LSUA
Louisiana State University at Alexandria
RFQ-0000002786

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: Ashe Broussard Weinzettle Architects and dated: April 2026

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.

Additive Alternate No. 1 Provide all labor, materials to 1. Replace all carpet and base, 2. Replace all resilient flooring and base, for the lump sum of:

_____Dollars ($ _____)

Additive Alternate No. 2 Provide all labor, materials to 1. Construct new wall between Waiting 102 and Clinic 105 from floor up to bottom of existing ceiling 2. Install curtain wall system with arch window in lieu of storefront system/metal panel infill arch, for the lump sum of:

_____Dollars ($ _____)

Additive Alternate No. 3 Provide all labor, materials to 1. Remove raised concrete terrace along Eighth and Jackson Streets 2. Remove existing sign and install new sign, 3. Replace all existing window blinds with new, 4. Demolish existing wall and create room I.T. 128, 5. Replace existing door and wall with new door mark 127B, 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

INSTRUCTIONS TO BIDDERS

COMPLETION TIME:

The Bidder shall agree to fully complete the contract within **One Hundred Eighty** (**180**) consecutive calendar days, subject to such extension as may be granted under Paragraph 8.3, in the General Conditions and the Supplementary Conditions, and acknowledges that this Construction work may start on or after the date specified in the "Notice to Proceed." Contractor may mobilize to the site before the date set forth on the notice to proceed only with the prior written consent of Owner.

LIQUIDATED DAMAGES:

The Bidder shall agree to pay as Liquidated Damages the amount of:

Five Hundred and no/100 Dollars **$ 500.00** for each consecutive calendar day for which the work is not complete, beginning with the first day beyond the completion date or days stated on the "Notice to Proceed" or as amended by change order.

ARTICLE 1

DEFINITIONS

1.1 The Contract Documents include the following:

Advertisement for Bids
Instructions to Bidders
Bid Form
Bid Bond
General Conditions of the Contract for Construction
AIA Document A201, 2007 Edition
Supplementary Conditions
Contract Between Owner and Contractor and Performance and Payment Bond
Contractor's Affidavit
Owner Documents (if applicable)
Change Order Form
Partial Occupancy Form
Recommendation of Acceptance
Asbestos Abatement (if applicable)
Other Documents (if applicable)
Specifications & Drawings
Addenda issued during the bid period and acknowledged in the Bid Form
Affidavit regarding Verification of Employees
Attestation Clause (Past Criminal Convictions of Bidders and Verification of Employees)

1.2 All definitions set forth in the General Conditions of the Contract for Construction, AIA Document A201, and the Supplementary Conditions are applicable to the Bid Documents.

1.3 Addenda are written and/or graphic instruments issued by the Prime Designer prior to the opening of bids, which modify or interpret the Bid Documents by addition, deletions, clarifications, corrections and prior approvals.A bid is a complete and properly signed proposal to do the work or designated portion thereof for the sums stipulated therein supported by data called for by the Bid Documents.

1.4 The base bid is the sum stated in the bid for which the Bidder offers to perform the Work described as the base bid, to which work may be added, or deleted for sums stated in alternate bids.

1.5 An alternate bid (or alternate) is an amount stated in the bid to be added to or subtracted from the amount of the base bid if the corresponding change in project scope or materials or methods of construction described in the Bid Documents, is accepted.

1.6 A Bidder is one who submits a bid for a prime Contract with the Owner for the work described in the proposed Bid Documents.

1.7 A Sub-bidder is one who submits a bid to a Bidder for materials, equipment and/or labor for a portion of the Work.

1.8 Where the word "Architect" is used in any of the documents, it shall refer to the Prime Designer of the project, regardless of discipline.

1.9 The Owner is defined as Board of Supervisors of Louisiana State University and Agricultural and Mechanical College and hereinafter referred to as Owner (University.)

ARTICLE 2

PRE-BID CONFERENCE

2.1 A Pre-Bid Conference may be held at the project site at least ten (10) days before the date for receipt of bids. The Prime Designer shall coordinate the setting of the date, time and place for the Pre-Bid Conference with the Owner and shall invite in writing the Owner, and all who have received sets of the Bid Documents to attend. The purpose of the Pre-Bid Conference is to familiarize Bidders with the requirements of the Project and the intent of the Bid Documents, and to receive comments and information from interested Bidders. If the Pre-Bid Conference is stated in the Advertisement for Bids to be a Mandatory Pre-Bid Conference, bids shall be accepted only from those bidders who attend the Pre-Bid Conference. Contractors who are not in attendance for the **entire** Pre-Bid Conference will be considered to have not attended.

2.1.1 For projects located on the LSU Campus, a parking fee will be assessed for any parking spaces provided, in the sole discretion of Owner, outside of the Work Area, as defined in the contract documents, if spaces are available. Contact the LSU Office of Parking and Transportation (Phone 225-578-5000).

2.2 Any revision of the Bid Documents made as a result of the Pre-Bid Conference shall not be valid unless included in an addendum.

ARTICLE 3

BIDDER'S REPRESENTATION

3.1 Each Bidder by making a bid represents that:

3.1.1 The Bidder has read and understands the Bid Documents and the bid is made in accordance therewith.

3.1.2 The Bidder has visited the site and is familiar with the local conditions under which the work is to be performed.

3.1.3 The Bidder's bid is based solely upon the materials, systems, equipment and labor described in the Bid Documents as advertised and as modified by addenda.

3.1.4 The Bidder's bid is not based on any verbal instructions contrary to the Bid Documents and Addenda.

3.1.5 The Bidder is familiar with Code of Governmental Ethics requirement that prohibits public servants and/or their immediate family members from bidding on or entering into contracts; he is aware that the Prime Designer and its principal owners are considered Public Servants under the Code of Governmental Ethics for the limited purposes and scope of the Design Contract with the Owner on this Project (see Ethics Board Advisory Opinion, No. 2009-378 and 2010-128); and neither he nor any principal of the Bidder with a controlling interest therein has an immediate family relationship with the Prime Designer or any principal within the Prime Designer's firm. (see La. R.S. 42:1113). Any Bidder submitting a bid in violation of this clause shall be disqualified and any contract entered into in violation of this clause shall be null and void.

3.2 The Bidder must be fully qualified under any State or local licensing law for Contractors in effect at the time and at the location of the work before submitting a bid. In the State of Louisiana, Revised Statutes 37:2150; et seq. will be considered, if applicable.

The Contractor shall be responsible for determining that all of the Sub-bidders or prospective Subcontractors are duly licensed in accordance with law.

ARTICLE 4

BIDDING DOCUMENTS

4.1 COPIES

4.1.1 Bid Documents may be obtained from the Prime Designer for a deposit as stated in the Advertisement for Bids. The deposit will be refunded as stated in the Advertisement for Bids. No deposits will be refunded on Bid Documents returned later than ten (10) days after receipt of bids.

4.1.2 As an alternative method of distribution, the Prime Designer may provide the Bidding Documents in electronic format. They may be obtained without charge and without deposit as stated in the Advertisement for Bids.

4.1.2.1. If electronic distribution is available, printed copies will not be available from the Prime Designer, but arrangements can be made to obtain them through most reprographic firms and/or plan rooms.

4.1.3 Complete sets of Bid Documents shall be used in preparing bids; neither the Owner nor the Prime Designer assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bid Documents.

4.1.4 The Owner or Prime Designer in making copies of the Bid Documents available on the above terms, do so only for the purpose of obtaining bids on the work and do not confer a license or grant for any other use.

4.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

4.2.1 Bidders shall promptly notify the Prime Designer in writing of any ambiguity, inconsistency or error which they may discover upon examination of the Bid Documents or of the site or local conditions.

4.2.2 Bidders requiring clarification or interpretation of the Bid Documents shall make a written request to the Prime Designer, to reach him at least seven (7) calendar days prior to the date for receipt of the bids.

4.2.3 Any interpretation, correction, or change of the Bid Documents will be made by addendum. Interpretations, corrections or changes of the Bid Documents made in any other manner will not be binding and Bidders shall not rely upon such interpretations, corrections, and changes.

4.3 SUBSTITUTIONS

4.3.1 The materials, products and equipment described in the Bid Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution. No substitutions shall be allowed after bidding.

4.3.2 No substitution will be considered unless written request for approval has been submitted by the Proposer and has been received by the Prime Designer at least seven (7) working days prior to the opening of Bids. (R.S. 38:2295C) Each such request shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitute including model numbers, drawings, cuts, performance and test data and any other information necessary for an evaluation. A statement setting forth any changes in other materials, equipment or work that incorporation of the substitute would require shall be included. It shall be the responsibility of the proposer to include in his proposal all changes required of the Bid Documents if the proposed product is used. Prior approval is given contingent upon supplier being responsible for any costs which may be necessary to modify the space or facilities needed to accommodate the materials and equipment approved. The burden of proof of the merit of the proposed substitution is upon the Proposer.

4.3.3 If the Prime Designer approves any proposed substitution, such approval will be set forth in an addendum. Bidders shall not rely upon approvals made in any other manner.

4.4 ADDENDA

4.4.1 Addenda will be mailed or delivered to all who are known by the Prime Designer to have received a complete set of Bid Documents.

4.4.2 Copies of addenda will be made available for inspection wherever Bid Documents are on file for that purpose.

4.4.3 Except as described herein, addenda shall not be issued within a period of seventy-two (72) hours prior to the advertised time for the opening of bids, excluding Saturdays, Sundays, and any other legal holidays. If the necessity arises of issuing an addendum modifying plans and specifications within the seventy-two (72) hour period prior to the advertised time for the opening of bids, then the opening of bids shall be extended at least seven (7) but no more than twenty-one (21) working days, without the requirement of re-advertising. The Owner shall be consulted prior to issuance of such an addendum and shall approve such issuance. The revised time and date for the opening of bids shall be stated in the addendum.

4.4.4 Each Bidder shall ascertain from the Prime Designer prior to submitting his bid that he has received all addenda issued, and he shall acknowledge their receipt on the Bid Form.

4.4.5 The Owner shall have the right to extend the bid date by up to thirty (30) days without the requirement of re-advertising. Any such extension shall be made by addendum issued by the Prime Designer.

4.5 MANUFACTURERS OR BRAND NAMES

4.5.1 Whenever manufacturers' brand names appear in these specifications, they are used only to denote the quality standard of product desired and they do not restrict bidders to the specific brand, make, manufacturer, or specification named; they are used only to set forth and convey to prospective bidders the general style, type, character and quality of product desired, and equivalent products will be acceptable, provided prior approval is obtained as provided herein.

ARTICLE 5

BIDDING PROCEDURE

5.1 FORM AND STYLE OF BIDS

5.1.1 Bids shall be submitted on the Louisiana Uniform Public Work Bid Form provided by the Prime Designer.

5.1.2 All blanks on the Bid Form shall be filled in by typewriter or manually in ink.

5.1.3 Bid sums shall be expressed in both words and figures, and in case of discrepancy between the two, the written words shall govern.

5.1.4 Any interlineations, alteration or erasure must be initialed by the signer of the bid or his authorized representative.

5.1.5 Bidders are cautioned to complete all alternates should such be required in the Bid Form. Failure to submit alternate prices will render the bid non-responsive and shall cause its rejection.

5.1.6 Bidders are cautioned to complete all unit prices should such be required in the Bid Form. Unit prices represent a price proposal to do a specified quantity and quality of work. Unit prices are incorporated into the base bid but are not the sole components thereof.

5.1.7 Bidders are strongly cautioned to ensure that all blanks on the bid form are completely and accurately filled in.

5.1.8 Bidder shall make no additional stipulations on the Bid Form nor qualify his bid in any other manner.

5.1.9 The bid shall include the legal name of Bidder and shall be signed by the person or persons legally authorized to bind the Bidder to a Contract. The authority of the signature of the person submitting the bid shall be deemed sufficient and acceptable under any of the following conditions:

(a) Signature on bid is that of any corporate officer or member of a partnership or partnership in commendam listed on most current annual report on file with Secretary of State.

(b) Signature on bid is that of authorized representative of corporation, partnership, or other legal entity and bid is accompanied by corporate resolution, certification as to the corporate principal, or other documents indicating authority.

(c) Corporation, partnership, or other legal entity has filed in the records of the Secretary of State, an affidavit, resolution or other acknowledged or authentic document indicating the names of all parties authorized to submit bids for public contracts. A bid submitted by an agency shall have a current Power of Attorney attached certifying agent's authority to bind Bidder. The name and license number on the bid shall be the same as the entity identified on the Bid Form.

5.1.10 On any bid in excess of fifty thousand dollars ($50,000.00), the Contractor shall certify that he is licensed under R.S. 37:2150-2173 and show his license number on the bid above his signature or his duly authorized representative.

5.2 BID SECURITY

5.2.1 No bid shall be considered or accepted unless the bid is accompanied by bid security in an amount of not less than five percent (5%) of the base bid and all alternates.

The bid security shall be in the form of a certified check or cashier's check drawn on the bank insured by the Federal Deposit Insurance Corporation, or a Bid Bond written by a surety company licensed to do business in Louisiana and signed by the surety's agent or attorney-in-fact. The Bid Bond and the surety for the bond must meet the qualifications stated thereon. The Bid Bond shall include the legal name of the Bidder be in favor of the Louisiana State University and Agricultural and Mechanical College and shall be accompanied by appropriate power of attorney. The Bid Bond must be signed by both the bidder/principal and the surety in the space provided on the Bid Bond Form. Failure by the bidder/principal or the surety to sign the bid bond shall result in the rejection of the bid.

Bid security furnished by the Contractor shall guarantee that the Contractor will, if awarded the work according to the terms of his proposal, enter into the Contract and furnish Performance and Payment Bonds as required by these Bid Documents, within ten (10) days after written notice that the instrument is ready for his signature.Should the Bidder refuse to enter into such Contract or fail to furnish such bonds, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as penalty.

5.2.2 The Owner will have the right to retain the bid security of Bidders until either (a) the Contract has been executed and bonds have been furnished, or (b) the specified time has elapsed so that bids may be withdrawn, or (c) all bids have been rejected.

5.3 SUBMISSION OF BIDS

All bids must be submitted electronically to LSU Procurement Services. Bids must be received at the "Return Bid To" email address no later than the due date and time specified herein. Bids must be emailed to lsubids@lsu.edu (This email address should be used for bid submissions only). Any bids sent directly to the Buyer of record will not be forwarded to the “Return Bid To” email.

When submitting electronically, the RFQ number and solicitation title should be listed in the subject line of the email. An original and redacted copy (if applicable) must be submitted electronically. Hard copies of bids will not be accepted; therefore, they will not be evaluated.

It is the responsibility of the Supplier to ensure the bid is received by LSU Procurement by the indicated due date and time. Any delays that may occur in transmission of the bid is the responsibility of the supplier. A bid will be considered late if it is not received at the “Return Bid To” email address by the indicated due date and time.

The maximum email attachment size accepted is 125 MB. It is the supplier’s responsibility to ensure bid submission is sized such that it is successfully transmitted and received by LSU. If the bid response is too large to be emailed as one document, the bid must be sent as separate documents. Each submittal should be labeled. (Example – Bid Submittal 1 out of 3 for RFQ-000000XXXX - Title; Bid Submittal 2 out of 3 for RFQ-000000XXXX - Title, etc.). If any submittal is received late, LSU will not consider the late submittal(s). Only the submittal(s) received by the due date and time will be considered Late bids will not be accepted per LAC 34:XIII.515.B.

5.4 MODIFICATION OR WITHDRAWAL OF BID

5.4.1 A bid may not be modified, withdrawn or canceled by the Bidder during the time stipulated in the Advertisement for Bids, for the period following the time and bid date designated for the receipt of bids, and Bidder so agrees in submitting his bid, except in accordance with R.S. 38:2214, which states, in part:

> Bids containing patently obvious, unintentional, and substantial mechanical, clerical, or mathematical errors, or errors of unintentional omission of a substantial quantity of work, labor, material, or services made directly in the compilation of the bid, may be withdrawn by the contractor if clear and convincing sworn, written evidence of such errors is furnished to the public entity within forty-eight hours of the bid opening excluding Saturdays, Sundays, and legal holidays. Such errors must be clearly shown by objective evidence drawn from inspection of the original work papers, documents, or materials used in the preparation of the bid sought to be withdrawn. If the public entity determines that the error is a patently obvious mechanical, clerical, or mathematical error, or unintentional omission of a substantial quantity of work, labor, material, or services, as opposed to a judgment error, and that the bid was submitted in good faith it shall accept the withdrawal and return the bid security to the contractor.

5.4.2 Prior to the time and date designated for receipt of bids, bids submitted early may be modified or withdrawn only by notice to the party receiving bids at the place and prior to the time designated for receipt of bids.

5.4.3 Withdrawn bids may be resubmitted up to the time designated for the receipt of bids provided that they are then fully in conformance with these Instructions to Bidders.

5.4.4 Bid Security shall be in an amount sufficient for the bid as modified or resubmitted.

ARTICLE 6

CONSIDERATION OF BIDS

6.1 OPENING OF BIDS

6.1.1 The properly identified Bids received on time will be opened publicly and will be read aloud, and a tabulation abstract of the amounts of the base bids and alternates, if any, will be made available to Bidders.

6.2 REJECTION OF BIDS

6.2.1 The Owner shall have the right to reject any or all bids as allowed by La. R.S. 38:2214 and in particular to reject a bid not accompanied by the required bid security or data required by the Bidding Documents or a bid in any way incomplete or irregular.

6.3 ACCEPTANCE OF BID

6.3.1 It is the intent of the Owner, if he accepts any alternates, to accept them in order in which they are listed in the Bid Form. Determination of the Low Bidder shall be on the basis of the sum of the base bid and the alternates accepted. However, the Owner shall reserve the right to accept alternates in any order which does not affect determination of the Low Bidder.

ARTICLE 7

POST-BID INFORMATION

7.1 SUBMISSIONS

7.1.1 At the Pre-Construction Conference, the Contractor shall submit the following information to the Prime Designer.

7.1.1.1 A designation of the work to be performed by the Contractor with his own forces.

7.1.1.2 A breakdown of the Contract cost attributable to each item listed in the Schedule of Values. No payments will be made to the Contractor until this is received.

7.1.1.3 The proprietary names and the suppliers of principal items or systems of material and equipment proposed for the work.

7.1.1.4 A list of names and business domiciles of all Subcontractors, manufacturers, suppliers or other persons or organizations (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the work. It is the preference of the Owner that, to the greatest extent possible or practical, the Contractor utilize Louisiana Subcontractors, manufacturers, suppliers and labor.

7.1.2 The Contractor will be required to establish to the satisfaction of the Prime Designer the reliability and responsibility of the proposed Subcontractors to furnish and perform the work described in the sections of the Specifications pertaining to such proposed Subcontractor's respective trades. The General Contractor shall be responsible for actions or inactions of Subcontractors and/or material suppliers.

The General Contractor is totally responsible for any lost time or extra expense incurred due to a Subcontractor's/or Material Supplier's failure to perform. Failure to perform includes, but is not limited to, a Subcontractor's financial failure, abandonment of the project, failure to make prompt delivery, or failure to do work up to standard. Under no circumstances shall the Owner mitigate the General Contractor's losses or reimburse the General Contractor for losses caused by these events.

7.1.3 Subcontractors and other persons and organizations selected by the Bidder must be used on the work for which they were proposed and shall not be changed except with the written approval of the Owner and the Prime Designer.

7.1.4 The lowest responsive and responsible bidder shall submit to the Prime Designer and the Owner within ten days after the bid opening a letter/letters from the manufacturer stating

that the manufacturer will issue the roof system guarantee complying with the requirements of Owner based on the specified roof system and include the name of the applicator acceptable to the manufacturer at the highest level of certification for installing the specified roof system. This manufacture shall be one that has received prior approval or is named in the specifications.

In accordance with La. R.S. 23:1726(B), LA. R.S. 38:2227 and LA. R.S. 38:2212.10, each bidder on this project must submit the completed Affidavit regarding Verification of Employees and Attestation Form (Past Criminal Convictions of Bidders, Verification of Employees, and Certification Regarding Unpaid Worker's Comp.), found within this bid package. The completed Affidavit and Attestation forms shall be submitted to the Office of Procurement, Room 213 Thomas Boyd Hall, Louisiana State University and Agricultural and Mechanical College within ten (10) days after the opening of bids.

ARTICLE 8

PERFORMANCE AND PAYMENT BOND

8.1 BOND REQUIRED.

8.1.1 The Contractor shall furnish and pay for a Performance and Payment Bond written by a company licensed to do business in Louisiana, which shall be signed by the surety's agent or attorney-in-fact, in an amount equal to 100% of the Contract amount. Surety must be listed currently on the U.S. Department of the Treasury Financial Management Service List (Treasury List) as approved for an amount equal to or greater than the contract amount, or must be an insurance company domiciled in Louisiana or owned by Louisiana residents. If surety is qualified other than by listing on the Treasury list, the contract amount may not exceed fifteen percent of policyholders' surplus as shown by surety's most recent financial statements filed with the Louisiana Department of Insurance and may not exceed the amount of $500,000. However, a Louisiana domiciled insurance company with at least an A- rating in the latest printing of the A.M. Best's Key Rating Guide shall not be subject to the $500,000 limitation, provided that the contract amount does not exceed ten percent of policyholders' surplus as shown in the latest A.M. Best's Key Rating Guide nor fifteen percent of policyholders' surplus as shown by surety's most recent financial statements filed with the Louisiana Department of Insurance. The Bond shall be signed by the surety's agent or attorney-in-fact. The bond shall be in favor of the Louisiana State University and Agricultural and Mechanical College.

8.2 TIME OF DELIVERY AND FORM OF BOND.

8.2.1 The Bidder shall deliver the required bond to the Owner simultaneous with the execution of the Contract.

8.2.2 Performance Bond and Labor and Materials Payment Bond shall be executed on the AIA Standard Form; Document A311 or A312-2010 forms.

8.2.3 The Bidder shall require the Attorney-In-Fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the Power of Attorney.

ARTICLE 9

FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

9.1 FORM TO BE USED

9.1.1 Form of the Contract to be used shall be furnished by the Owner.

9.2 AWARD

9.2.1 Before award of the Contract, the successful Bidder shall furnish to the Owner a copy of a Disclosure of Ownership Affidavit stamped by the Secretary of State, a certified copy of the minutes of the corporation or partnership meeting which authorized the party executing the bid to sign on behalf of the Contractor.

9.2.2 In accordance with Louisiana Law, when the Contract is awarded, the successful Bidder shall, at the time of the signing of the Contract, execute the Non-Collusion Affidavit included in the Contract Documents.

9.2.3 When this project is financed either partially or entirely with State Bonds the award of this Contract is contingent upon the sale of bonds by the State Bond Commission. The Owner shall incur no obligation to the Contractor until the Contract Between Owner and Contractor is duly executed.

ARTICLE 10

MATERIAL SALVAGE AND DISPOSAL

10.1 The University shall have priority for the selection of salvaged materials and equipment. Any excess dirt, equipment and material selected to remain the property of the University, shall be removed and delivered to a location on the campus as designated by the University. Material and equipment not retained by the University shall become the property of the Contractor and shall be removed from the campus by the Contractor.

ARTICLE 11

OCCUPATIONAL AND ENVIRONMENTAL SAFETY

11.1 The Contractor shall keep the construction site free from hazards and shall conduct his work with the least effect on the environment and faculty, staff and students of the University. The Contractor shall maintain the project and the various sites in compliance with the applicable OSHA Standards.

11.2 The Contractor shall initiate and forward a copy of the site safety plan (written documentation of a working and active employee safety program as defined by the OSHA Construction Standard),

along with the site safety supervisor's name and a 24-hour phone number, to the LSU Office of Occupational and Environmental Safety (OES).

11.3 The construction site shall be restricted to unauthorized personnel. High hazard areas involving machinery, hot work, electrical hazards, overhead work, excavations, etc., shall be barricaded and the barricade must be enforced at all times.

11.4 LSU students, faculty and staff shall not be exposed to any harmful construction debris or hazardous materials (i.e., lead-based paint, asbestos, dust, noise, vapors, etc.). Where contaminants generated by construction may enter adjacent occupied building spaces, the Contractor shall erect a containment system sufficient to protect LSU faculty, staff and students from exposure. The containment system shall also be subject to approval by LSU Facility and Safety Personnel.

11.5 Any injury requiring medical attention which occurs on site must be reported to OES, and the Contractor shall conduct an investigation and develop action plan for prevention. This action plan may be reviewed by OES upon request and/or OES may be an observer in this investigation.

End of Instructions to Bidders.

GENERAL CONDITIONS

The 2007, Edition of the General Conditions of the Contract for Construction, American Institute of Architects Document A-201, are hereby made part of this Specification to the same extent as if bound herein.

Where the Supplementary Conditions conflict or contradict the AIA General Conditions, the Supplementary Conditions are to take precedence. Only those portions of the General Conditions specifically mentioned in the Supplementary Conditions shall be changed.

For those persons not familiar with or are without complete understanding of all the conditions as set forth in the 2007 AIA General Conditions, a copy of this document may be examined at the LSU Office of Planning, Design and Construction, located in the LSU Planning, Design and Construction Building or the appointed Prime Designer's office.

A copy of the 2007 AIA General Conditions, along with all other Contract Documents shall be kept on the jobsite by Contractor at all times.

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions modify, change, delete from or add to the General Conditions of the Contract for Construction, AIA Document A201, 2007 Edition. Where any Article of the General Conditions is modified or any Paragraph, Subparagraph or Clause thereof is modified or deleted by these supplements, the unaltered provisions of that Article, Paragraph, Subparagraph or Clause shall remain in effect.

Articles, Paragraphs, Subparagraphs or Clauses modified or deleted have the same numerical designation as those occurring in the General Conditions.

ARTICLE 1

GENERAL PROVISIONS

1.1 BASIC DEFINITIONS

1.1.1 THE CONTRACT DOCUMENTS

Delete the third sentence, and add the following sentence:

The Contract Documents shall include the Bidding Documents as listed in the Instructions to Bidders and any modifications made thereto by addenda. The contractor Documents shall not include any exclusions, exception or changes by Contractor that have not been accepted in writing by Owner pursuant to Addenda or change order.

1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE [REFER TO LA. R.S. 38:2317]

1.5.1 Delete the first sentence; In the last sentence: delete the remainder after the word "publication".

1.5.3 Add **1.5.3** as follows:

1.5.3 Architect will furnish Contractor one (1) complete set of Contract Documents for construction, either electronically or on paper. Contractor shall pay reproduction costs for additional sets required by him.

ARTICLE 2

OWNER

2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

2.2.1 Delete **2.2.1**

2.2.2 In the first sentence, delete everything before "the Owner shall secure."

ARTICLE 3

CONTRACTOR

3.4 LABOR AND MATERIALS

3.4.2 Delete **3.4.2**

3.4.3 Delete **3.4.3** and replace with the following:

3.4.3 Contractor and its employees, officers, agents, representatives, and Subcontractors shall conduct themselves in an appropriate and professional manner, in accordance with the Owner's requirements, at all times while working on the Project. Any such individual who behaves in an inappropriate manner or who engages in the use of inappropriate language or conduct while on Owner's property, as determined by the Owner, shall be removed from the Project at the Owner's request. Such individual shall not be permitted to return without the written permission of the Owner. The Owner shall not be responsible or liable to Contractor or any Subcontractor for any additional costs, expenses, losses, claims or damages incurred by Contractor or its Subcontractor as a result of the removal of an individual from the Owner's property pursuant to this paragraph. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS [R.S. 40:1724(A)]

3.7.1 Delete **3.7.1**

3.7.2 Replace the word "public" with the word "University".

Delete **3.7.5** and replace with the following:

3.7.5 If, during the course of the Work, the Contractor discovers human remains, unmarked burial or archaeological sites, burial artifacts, or wetlands, which are not indicated in the Contract Documents, the Contractor shall follow all procedures mandated by State and Federal law, including but not limited to La. R.S. 8:671 *et seq.* and Sections 401 and 404 of the Federal Clean Water Act. Request for adjustment of the Contract Sum and Contract Time arising from the existence of such remains or features shall be submitted in writing to the Owner pursuant to the Contract Documents. Owner may elect to have another contractor perform any or all additional work or remediation arising from such condition and Contractor shall stop work at Owners request, at no additional cost to Owner, while such additional work or remediation is performed.

3.8 ALLOWANCES

Delete **3.8.1**, **3.8.2** and **3.8.3** in their entirety and add **3.8.1** as follows:

3.8.1 Allowances shall not be made on any of the Work.

3.9 SUPERINTENDENT

3.9.1 Add the following to the end of the paragraph: Important communications shall be confirmed in writing. Other communications shall be similarly confirmed on written request in each case.

3.9.4 Add **3.9.4** as follows:

3.9.4 The Superintendent shall remain on the project when any work is being performed or materials are being delivered. The Superintendent shall be approved by the Owner. Should the approved Superintendent be unable to complete project his replacement(s) shall also be approved by the Owner. For good cause Owner may require Contractor to replace Superintendent at no additional cost to Owner.

3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

3.10.1 Add the following to the end of the paragraph:

The Contractor shall include with the schedule, for the Owner's and Architect's information, an analysis to identify those tasks which are on the critical path, i.e. where any delay in the completion of these tasks will lengthen the project timescale, unless action is taken. A revised schedule shall be submitted with each Application and Certificate for Payment. No payment will be made until this schedule is received. To the extent Contractor claims that it has been delayed in performing its work in whole or in part by Owner or Architect, then Contractor shall specifically list such delays with each revised schedule.

3.10.3 Delete the word "...general..." and add the following:

If the work is not on schedule, as determined by the Architect, and the Contractor fails to take action to bring the work on schedule, then the Contractor shall be deemed in default under this Contract and the progress of the work shall be deemed unsatisfactory. Such default may be considered grounds for termination by the Owner for cause in accordance with 14.2.

3.10.4 Add **3.10.4** as follows:

3.10.4 Submittal by the contractor of a schedule or other documentation showing a completion date for his work prior to the completion date stated in the contract shall not impose any obligation or responsibility on the Owner or Architect for the earlier completion date unless the changed completion date is accepted by the owner in a change order.

3.10.5 Add **3.10.5** as follows:

3.10.5 In the event the Owner employs a commissioning consultant, the Contractor shall cooperate fully in the commissioning process and shall require all subcontractors and others under his control to cooperate. The purpose of such services shall be to ensure that all systems perform correctly and interactively according the provisions of the Contract Documents.

3.11 DOCUMENTS AND SAMPLES AT THE SITE

Add the following to the end of the paragraph:

This requirement is of the essence of the contract. The Architect shall determine the value of these documents and this amount shall not be approved for payment to the Contractor until all of the listed documents are delivered to the Architect in good order, completely marked with field changes and otherwise complete in all aspects.

ARTICLE 4

ARCHITECT

4.1 GENERAL

Delete **4.1.1** and replace with the following:

4.1.1 The term Architect, when used in the Contract Documents, shall mean the Architect (Architect, Engineer or Landscape Architect), or his authorized representative, lawfully licensed to practice architecture, engineering or landscape architecture in the State of Louisiana, identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number.

4.1.3 Delete the words "as to whom the Contractor has no reasonable objection and"

4.2 ADMINISTRATION OF THE CONTRACT

4.2.1 In the first sentence, delete the phrase "the date the Architect issues the final Certificate for Payment" and replace with the phrase "final payment is due, and with the Owner's concurrence, from time to time during the one-year period for correction of Work described in Section 12.2."

4.2.2 In the first sentence, after the phrase "become generally familiar with" insert the following: "and to keep the Owner informed about".

In the first sentence, after the phrase "portion of the Work completed," insert the following: "to endeavor to guard the Owner against defects and deficiencies in the Work,"

4.2.2.1 Add **4.2.2.1** as follows:

4.2.2.1 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for meetings and site visits made necessary by the fault of the Contractor or by defects and deficiencies in the Work.

4.2.10 Add the following sentence to the end of **4.2.10**: There will be no restriction on the Owner having a Representative.

4.2.11 Add the following sentence to the end of **4.2.11**:

If no agreement is made concerning the time within which interpretation required of the Architect shall be furnished in compliance with this Section 4.2, then delay shall not be recognized on account of failure by the Architect to furnish such interpretation until 15 days after written request is made for them.

4.2.14 Insert the following sentence between the second and third sentence of **4.2.14**:

If no agreement is made concerning the time within which interpretation required of the Architect shall be furnished in compliance with this Section 4.2, then delay shall not be recognized on account of failure by the Architect to furnish such interpretation until 15 days after written request is made for them.

ARTICLE 5

SUBCONTRACTORS

5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

Delete **5.2.1** and replace with the following:

5.2.1 Unless otherwise required by the Contract Documents, the Contractor shall furnish at the Pre-Construction Conference, to the Owner and the Architect, in writing, the names of the persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the work. No Contractor payments shall be made until this information is received.

Delete **5.2.2** and replace with the following:

5.2.2 The Contractor shall be solely responsible for selection and performance of all subcontractors, and shall verify that all subcontractors maintain the required insurance coverages. The Contractor shall not be entitled to claims for additional time and/or an increase in the contract sum due to a problem with performance or non-performance of a subcontractor.

Delete **5.2.3** and **5.2.4** and add the following:

5.2.3 The Contractor shall notify the Owner when a subcontractor is to be changed and substituted with another subcontractor.

5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTORS

Delete **5.4.1**, **5.4.2** and **5.4.3**

ARTICLE 7

CHANGES IN THE WORK

7.1 GENERAL

Add **7.1.4** as follows:

7.1.4 As part of the pre-construction conference submittals, the Contractor is to submit the following prior to the commencement of work.

(1) Fixed job site overhead cost itemized with documentation to support daily rates.
(2) Bond Premium Rate with supporting information from the General Contractor's carrier.
(3) Labor Burden by trade for both Subcontractors and General Contractor.
(4) Internal Rate Charges for all significant company owned equipment.

Failure to submit this information as part of the pre-construction submittals shall prohibit the Contractor from claiming these items as costs on any change order issued on the project.

7.2 CHANGE ORDERS

Delete **7.2.1** and replace with the following:

7.2.1 A Change Order is a written order to the Contractor prepared by the Architect and signed by the Owner and the Architect, issued after 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. A Change Order signed by the Contractor indicates his agreement therewith, including the adjustment in the Contract Sum or the Contract Time. Any reservation of rights, stipulation, or other modification made on the change order by the contractor will have no effect.

Insert **7.2.2** as follows:

7.2.2 **"**Cost of Work" for the purpose of Change Orders shall be costs required to be incurred in performance of the work and paid by the Contractor and Subcontractors which shall consist of:

1. Wages paid direct labor personnel, delineating a labor burden markup for applicable payroll taxes, worker's compensation insurance, unemployment compensation, and social security taxes.
2. Cost of all materials and supplies, including the identification of each item and its cost including taxes.
3. Identify each necessary piece of machinery and equipment and its individual cost including taxes.
4. Increases in insurance premiums
5. Bond costs.

Credit will not be required for Overhead and Profit.

Insert **7.2.3** as follows:

7.2.3 "Overhead and Profit" The Contractor and Subcontractor shall be due job-site and home office fixed overhead and profits on the Cost of the Work, but shall not exceed a total of 25% of the direct cost of any portion of Work:

The credit to the Owner resulting from a change in the work shall be the sum of those items above, except credit will not be required for Overhead and Profit. Where a change results in both credits to the Owner and extras to the Contractor for related items, overhead and profit will only be computed on the net extra cost to the Contractor.

Insert **7.2.4** as follows:

7.2.4 The cost to the Owner resulting from a change in the Work shall be the sum of: "Cost of the Work" (as defined at 7.2.2) and "Overhead and Profit" (as defined at 7.2.4), and shall be computed as follows:

Insert **7.2.4.1** as follows:

7.2.4.1 When all Work is General Contract Work; 15% markup on the Cost of the Work.

Insert **7.2.4.2** as follows:

7.2.4.2 When the Work is all Subcontract Work; 15% markup on the Cost of the Work for Subcontractor's Overhead and Profit plus 10% markup on the Cost of the Work, not including the Subcontractor's Overhead and Profit markup, for General Contractor's Overhead and Profit.

Insert **7.2.4.3** as follows:

7.2.4.3 When the Work is a combination of General Contract Work and Subcontract Work; that portion of the direct cost that is General Contract Work shall be computed per 7.2.4.1 and that portion of the direct cost that is Subcontract Work shall be computed per 7.2.4.2.

Premiums for the General Contractor's bond may be included, but after the markup is added to the Cost of the Work.

Insert **7.2.4.4** as follows:

7.2.4.4 Subcontract cost shall consist of the items in 7.2.2 above plus Overhead and Profit as defined in 7.2.4.

Insert **7.2.5** as follows:

7.2.5 Before a Change Order is prepared, the Contractor shall provide and deliver to the Architect the following information concerning the Cost of the Work, not subject to waiver, within ten (10) business days after being notified to prepare said Change Order:

A detailed itemized list of labor, material and equipment costs for the General Contractor's Work including quantities and unit costs for each item of labor, material and equipment.

An itemized list of labor, material and equipment costs for each Subcontractor's and/or Sub-Subcontractor's Work including quantities and unit costs for each item of labor, material, and equipment.

Insert **7.2.6** as follows:

7.2.6 After a Change Order has been approved, no future requests for extensions of time or additional cost shall be considered for the materials and scope of work included in that Change Order.

Insert **7.2.7** as follows:

7.2.7 The Contractor will be due extended fixed job-site overhead for time delays only when complete stoppage of work occurs causing a contract completion extension, and the Contractor is unable to mitigate financial damages through replacement Work. The stoppage must be due to acts or omissions solely attributable to the Owner. In all cases the Contractor is to notify the Architect in writing as required by Article 15.1.2. Reasonable proof may be required by the Architect that

alternate Work could not be performed. Reasonable proof may be required by the Architect that the stoppage affected the Completion Date.

Insert **7.2.8** as follows:

7.2.8 "Cost of the Work" whether General Contract cost or Subcontract cost shall not apply to the following:

- Salaries or other compensation of the Contractor's personnel at the Contractor's principal office and branch offices.
- Any part of the Contractor's capital expenses, including interest on the Contractor's capital employed for the Work.
- Overhead and general expenses of any kind or the cost of any item not specifically and expressly included above in cost of the Work.
- Cost of supervision not specifically required by the Change Order.

Insert **7.2.9** as follows:

7.2.9 When applicable as provided by the Contract, the cost to Owner for Change Orders shall be determined by quantities and unit prices. The quantity of any item shall be as submitted by the Contractor and approved by the Architect. Unit prices shall cover cost of Material, Labor, Equipment, Overhead and Profit.

7.3 CONSTRUCTION CHANGE DIRECTIVES

7.3.3 In the first sentence after "following methods" add: ", but not to exceed a specified amount."

7.3.7 Delete the following from .1 of the list: "fringe benefits required by agreement or custom,"

Delete the following from .4 of the list: "permit fees,"

Delete the following from .5 of the list: "and field office personnel"

7.3.9 Delete **7.3.9** and substitute the following:

7.3.9 Pending final determination of the total costs of a Construction Change Directive to the Owner, amounts not in dispute for such changes in the Work shall be included in Applications for Payment accompanied by a Change Order indicating the parties' agreement with part or all of such costs.

ARTICLE 8

TIME

8.1 DEFINITIONS

Add the following:

8.1.5 The Contract Time shall not be changed by the submission of a schedule that shows an early completion date unless specifically authorized by change order.

8.2 PROGRESS AND COMPLETION

Add to **8.2.1** the following:

Completion of the work must be within the Time for Completion stated in the Agreement, subject to such extensions as may be granted under Section 8.3. The Contractor agrees to commence work not later than fourteen (14) days after the transmittal date of Written Notice to Proceed from the Owner and to substantially complete the project within the time stated in the Contract. The Owner will suffer financial loss if the project is not substantially complete in the time set forth in the Contract Documents. The Contractor and the Contractor's Surety shall be liable for and shall pay to the Owner the sum stated in the Contract Documents as fixed, agreed and liquidated damages for each consecutive calendar day (Saturdays, Sundays and holidays included) of delay until the work is substantially complete. The Owner shall be entitled to the sum stated in the Contract Documents. Such Liquidated Damages shall be withheld by the Owner from the amounts due the Contractor for progress payments.

Delete **8.2.2**

8.3 DELAYS AND EXTENSIONS OF TIME

8.3.1 In the first sentence after the words "Owner Pending" delete the words "mediation and arbitration" and add the word "litigation" and delete the last word "determine" and add the following: "recommend, subject to Owner's approval of Change Order. If the claim is not made within limits of Article 15, all right for future claims for that month are waived."

8.3.3 Delete **8.3.3**

ARTICLE 9

PAYMENTS AND COMPLETION

9.2 SCHEDULE OF VALUES

Delete **9.2** and replace with the following:

9.2 At the Pre-Construction Conference, the Contractor shall submit to the Owner and the Architect a Schedule of Values prepared as follows:

Add **9.2.1** as follows:

9.2.1 The attached Schedule of Values Format shall be used. If applicable, the cost of Work for each section listed under each division, shall be given. The cost for each section shall include Labor, Materials, Overhead and Profit.

Add **9.2.2** as follows:

9.2.2 The Total of all items shall equal the Total Contract Sum. This schedule, when approved by the Architect, shall be used as a basis for the Contractor's Applications for Payment and it may be used for determining the cost of the Work in deductive change orders, when a specific item of Work listed on the Schedule of Values is to be removed. Once the Schedule of Values is submitted at the Pre-Construction Conference, the schedule may not be modified without approval from the Owner and Architect.

9.3 APPLICATIONS FOR PAYMENT

Delete **9.3.1** and replace with the following:

9.3.1 Monthly, the Contractor shall submit to the Architect an Application & Certificate for Payment on the AIA Document G702-1992, accompanied by AIA Document G703-1992, and supported by any additional data substantiating the Contractor's right to payment as the Owner or the Architect may require. Application for Payment shall be submitted on or about the first of each month for the value of labor and materials incorporated into the Work and of materials, suitably stored, at the site as of the twenty-fifth day of the preceding month, less normal retainage as follows, per R.S. 38:2248:

Delete **9.3.1.1** and replace with the following:

9.3.1.1 Projects with Contract price up to $500,000.00 - 10% of the Contract price.

Delete **9.3.1.2** and replace with the following:

9.3.1.2 Projects with Contract price of $500,000.00, or more - 5% of the Contract price.

Add **9.3.1.3** as follows:

9.3.1.3 No payment will be made until the revised schedule required by 3.10.1 is received.

The normal retainage shall not be due the Contractor until after formal notice of acceptance is properly recorded and expiration of the forty-five (45) day period and submission to the Architect of a clear lien certificate and invoice for retainage.

Delete **9.3.2** and replace with the following:

9.3.2 Payments shall only be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work confirmed by the Architect. Payments for materials or equipment stored on the site shall be conditioned upon submission by the Contractor of bills of sale or such other procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, including applicable insurance.

Add **9.3.4** as follows:

9.3.4 Applications for Payment shall not include requests for payment for any costs or damage for delay, shutdown or startup.

9.5 DECISIONS TO WITHHOLD CERTIFICATION

9.5.1 Delete the word "repeated" from .7 of the list

9.5.3 Delete **9.5.3**

9.6 PROGRESS PAYMENTS

Delete **9.6.1** and replace with the following:

9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment within twenty days except for projects funded fully or in part by a Federal reimbursement program. For such projects the Owner will make payment in a timely manner consistent with reimbursement.

9.6.2 Delete the phrase: "no later than seven days" from the first sentence.

After the end of the second sentence, add the following:

R.S. 9:2784 (A) and (C) requires a Contractor or Subcontractor to make payment due to each Subcontractor and supplier within fourteen (14) consecutive days of the receipt of payment from the Owner. If not paid, a penalty in the amount of ½ of 1% per day is due, up to a maximum of 15%, from the expiration date until paid. The Contractor or Subcontractor, whichever is applicable, is solely responsible for payment of a penalty.

9.6.4 Delete the first two sentences of **9.6.4** and add the following to the end:

Pursuant to La. R.S. 38:2242, when the Owner receives any claim of nonpayment arising out of the Contract, the Owner may deduct 125% of such claim from the Contract Sum.

The Contractor, or any interested party, may deposit security, satisfactory to the Owner and in accordance with La. R.S. 38:2242.2, guaranteeing payment of the claim with the recorder of mortgages of the parish where the Work has been done. When the Owner receives original proof of such guarantee from the recorder of mortgages, the claim deduction will be added back to the Contract Sum.

9.7 FAILURE OF PAYMENT

Delete **9.7**

9.8 SUBSTANTIAL COMPLETION

Delete **9.8.1** and replace with the following:

9.8.1 Substantial Completion is the stage in the progress of the Work when the Work is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the

Work for its intended use. The Architect shall determine if the project is substantially complete in accordance with this Subparagraph.

Delete **9.8.2** and replace with the following:

9.8.2 When the Contractor considers that the Work 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.

Delete **9.8.3** and replace with the following:

9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work is substantially complete. A prerequisite to the Work being considered as substantially complete is the Owner's receipt of the executed Roofing Contractor's and Roofing Manufacturer's guarantees, where roofing work is part of the Contract. Prior to inspection by the Architect, the Contractor shall notify the Architect that the project is ready for inspection by the State Fire Marshall's office. 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 for its intended use, the Contractor shall, before the Work can be considered as Substantially Complete, 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.

Delete **9.8.4** and replace with the following:

9.8.4 When the Architect determines that the project is Substantially Complete, he shall prepare a "punch list" of exceptions and the dollar value related thereto. The monetary value assigned to this list will be the sum of the cost estimate for each particular item of Work the Architect develops based on the mobilization, labor, material and equipment costs of correcting the item and shall be retained from the monies owed the Contractor, above and beyond the standard lien retainage. The cost of these items shall be prepared in the same format as the schedule of values. At the end of the 45-day lien period payment shall be approved for all punch list items completed up to that time. After that payment, none of the remaining funds shall be due the Contractor until all punch list items are completed and are accepted by the Architect. If the dollar value of the punch list exceeds the amount of funds, less the retainage amount, in the remaining balance of the Contract, then the Project shall not be considered as substantially complete. If funds remaining are less than that required to complete the Work, the Contractor shall pay the difference.

Delete **9.8.5** and replace with the following:

9.8.5 When the preparation of the "punch list" is complete the Architect shall prepare a "Recommendation of Acceptance" incorporating the punch list and submit it to the Owner. Upon approval of the Recommendation of Acceptance, the Owner may issue a Notice of Acceptance of Building Contract, which shall establish the Date of Substantial Completion. The Contractor will record the Notice of Acceptance with the Clerk of Court in the Parish in which the work has been performed. If the Notice of Acceptance has not been recorded seven (7) days after issuance, the Owner may record the acceptance at the Contractor's expense. All additive change orders must be processed before issuance of the Recommendation of Acceptance. The Owner will not be responsible for payment for any work associated with change orders that is not incorporated into the contract at the time of the Recommendation of Acceptance.

Add **9.8.6** as follows:

9.8.6 Warranties required by the Contract Documents shall commence on the date of Acceptance of the Work unless otherwise agreed to in writing by the Owner and Contractor. Unless otherwise agreed to in writing by the Owner and Contractor, security, maintenance, heat, utilities, damage to the Work not covered by the punch list and insurance shall become the Owner's responsibility on the Date of Substantial Completion.

Add **9.8.7** as follows:

9.8.7 If all punch list items have not been completed by the end of the 45-day lien period, through no fault of the Architect or Owner, the Owner may hold the Contractor in default. If the Owner finds the Contractor is in default, the Surety shall be notified. If within forty-five (45) days after notification, the Surety or Contractor has not completed the punch list, through no fault of the Architect or Owner, the Owner may, at his option, contract to have the balance of the Work completed and pay for such work with the unpaid funds remaining in the Contract sum.

Finding the Contractor in default shall constitute a reason for disqualification of the Contractor from bidding on future University contracts. If the Surety fails to complete the punch list within the stipulated time period, the Owner may not accept bonds submitted, in the future, by the Surety.

9.9 PARTIAL OCCUPANCY OR USE

Delete **9.9.1** and replace with the following:

9.9.1 Partial Occupancy is that stage in the progress of the Work when a designated portion of the Work is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the designated portion of the Work for its intended use. The Owner may occupy or use any substantially completed portion of the Work so designated by separate agreement with the Contractor and authorized by public authorities having jurisdiction over the Work. Such occupancy or use may commence provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period of correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers the designated portion substantially complete the Contractor shall prepare and submit a list to the Architect as provided under Subparagraph 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld.

9.10 FINAL COMPLETION AND FINAL PAYMENT

After the first sentence in **9.10.1,** add the following:

If the Architect does not find the work acceptable under the Contract Documents, the Architect shall make one additional inspection; if the Work is still not acceptable, the Architect, and each of the Architect's principal consultants, shall be paid $175.00/hour for their time at the project site, for each additional inspection, to be withheld from the unpaid funds remaining in the Contract sum. The payment shall be deducted from the construction contract funds.

Replace **9.10.4** with the following:

The making of final payment shall not constitute a waiver of claims by the Owner for the following:

Delete “liens” from .1 of the list.

Delete “;or” from .2 of the list and add “irrespective of when such failure is discovered; or”

ARTICLE 10

PROTECTION OF PERSONS AND PROPERTY

10.2 SAFETY OF PERSONS AND PROPERTY

10.2.2 In the first sentence, between the words "bearing on" and "safety", add the words "the health and",

10.3 HAZARDOUS MATERIALS

10.3.1 In the first sentence after "(PCB)" add "or lead"

Insert the following after the first sentence:

Prior to commencing any work on site the Contractor shall obtain a completed "Contractor Notification of Asbestos Containing Building Materials Form" from the LSU Office of Facility Services, call 578-3186. This completed form indicates asbestos or polychlorinated biphenyl (PCB) that has been removed or its known location relevant to the construction project. The Contractor shall sign the form and return copies to the Architect, and the LSU Office of Facility Services prior to construction. Some asbestos or polychlorinated biphenyl (PCB) may not be identified. If, at any time, suspect material is encountered, the Contractor shall immediately stop Work and report the condition to the Architect, the LSU Office of Facility Services at 578-3186, and Environmental Health and Safety at 578-5640.

10.3.2 After the first sentence, delete all remaining sentences. Add at the end: The Contract time shall be extended appropriately.

10.4 EMERGENCIES

Delete **10.4** and replace with the following:

10.4 In an emergency affecting the safety of persons or property, the Contractor shall notify the Owner and Architect immediately of the emergency, simultaneously acting at his discretion to prevent damage, injury, or loss. Any additional compensation or extension of time claimed by the Contractor on account of emergency work shall be determined as provided in Article 15 and Article 7.

ARTICLE 11

INSURANCE AND BONDS

Delete all of **11.1, 11.2** and **11.3** and replace with the following:

INSURANCE REQUIREMENTS FOR NEW CONSTRUCTION, ADDITIONS AND RENOVATIONS

11.1 The Contractor shall purchase and maintain without interruption for the duration of the contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the Work hereunder by the Contractor, its agents, representatives, employees or subcontractors. The duration of the contract shall be from the inception of the contract until the date of final payment.

The policies and the certificates required herein shall name the Owner and Architect as an additional insureds and shall be subject to the approval of the Owner. Such insurance shall be primary to any other insurance policies of the Owner covering the same liabilities. The Contractor shall furnish the Owner copies of any endorsements that are subsequently issued amending coverage or limits.

To the extent of Contractors assumed liabilities, the Contractor's Insurance shall provide a waiver of subrogation in favor of the Owner and state that the Contractor's Insurance is primary to any other valid insurance available to the Owner and shall give Owner 30-day written notice of cancellation or material change.

The indemnity provisions shall be separate obligations of Contractor, and the enforceability or non-enforceability of the indemnity shall not prejudice any additional insured's rights under insurance.

Notwithstanding any other contrary language in this Agreement, Owner (as principal employer) and Contractor (as direct employer) mutually agree that it is their intention to recognize Owner as the statutory employer of Contractor's employees (whether these be direct employees or statutory employees of Contractor) while Contractor's employees are providing work and/or services to or on behalf of Owner under this Agreement. It is also recognized that the work contemplated by this Agreement is a part of the trade, business or occupation of Owner and is an integral part of and essential to the ability of the Owner to generate its goods, products and/or services. It is the express intention of Owner and Contractor that Owner enjoy the exclusive remedy protection afforded by La. R.S. 23:1032, and the designation of Owner as the statutory employer of Contractor's employees is included for the sole purpose of establishing a statutory employer relationship in accordance with the provisions of La. R.S. 23:1061(A)(3). This provision is not intended to create an employer/employee relationship for any other purpose(s). Contractor shall require in its contracts with Subcontractors that that it is their intention to recognize Owner as the statutory employer of Subcontractor's employees (whether these be direct employees or statutory employees of Subcontractor) while Subcontractor's employees are providing work and/or services to or on behalf of Owner. It is also recognized that the work contemplated is a part of the trade, business or occupation of Owner and is an integral part of and essential to the ability of the Owner to generate its goods, products and/or services. It is the express intention of Subcontractor that Owner enjoy the exclusive remedy protection afforded by La. R.S. 23:1032, and the designation of Owner as the statutory employer of Subcontractor's employees is included for the sole purpose of establishing a statutory employer relationship in accordance with the provisions of La. R.S. 23:1061(A)(3).

11.2 MINIMUM SCOPE AND LIMITS OF INSURANCE

Add **11.2.1** as follows:

11.2.1 Worker's Compensation

Worker's Compensation insurance shall be in compliance with the Worker's Compensation law of the State of Louisiana. Employers Liability is included with a minimum limit of $500,000 per accident/per disease/per employee. If work is to be performed over water and involves maritime exposure, applicable LHWCA, Jones Act or other maritime law coverage shall be included and the Employers Liability limit increased to a minimum of $1,000,000. A.M. Best's insurance company rating requirement may be waived for Worker's compensation coverage only.

Add **11.2.2** as follows:

11.2.2 Commercial General Liability

Commercial General Liability Insurance, including Personal and Advertising Injury Liability and Products and Completed Operations Liability, shall have a minimum limit per occurrence based on the project value. The Insurance Services Office (ISO) Commercial General Liability occurrence coverage form CG 0001 (current form approved for use in Louisiana), or equivalent, is to be used in the policy. Claims -Made form is unacceptable.

The aggregate loss limit must apply to each project. ISO form CG 2503 (current form approved for use in Louisiana), or equivalent, shall also be submitted. The State project number, including part number, and project name shall be included on this endorsement.

COMBINED SINGLE LIMIT (CSL) PER OCCURRENCE

Type of Construction	Projects up to $1,000,000	Projects over $1,000,000 up to $10,000,000	Projects over $10,000,000
New Buildings:			
Each Occurrence Minimum Limit	$1,000,000	$2,000,000	$4,000,000
Per Project Aggregate This Contract ONLY	$2,000,000	$4,000,000	$8,000,000
Renovations: The building(s) value for this Project is $_____.			
Each Occurrence Minimum Limit	$1,000,000**	$2,000,000**	$4,000,000**
Per Project Aggregate	2 times per occur limit**	2 times per occur limit**	2 times per occur limit**

**While the minimum Combined Single Limit of $1,000,000 is required for any renovation, the limit is calculated by taking 10% of the building value and rounding it to the nearest $1,000,000 to get the insurance limit. Example: Renovation on $33,000,000 building would

have a calculated $3,000,000 combined single limit of coverage (33,000,000 times .10 = 3,300,000 and then rounding down to $3,000,000). If the calculated limit is less than the minimum limit listed in the above charge, then the amount needed is the minimum listed in the chart. Maximum per occurrence limit required is $10,000,000 regardless of building value. The per project aggregate limit is then calculated as twice the per occurrence limit.

Add **11.2.3** as follows:

11.2.3 Automobile Liability

Automobile Liability Insurance shall have a minimum combined single limit per occurrence of $1,000,000. ISO form number CA 00 01 (current form approved for use in Louisiana.), or equivalent, is to be used in the policy. This insurance shall include third-party bodily injury and property damage liability for owned, hired and non-owned automobiles.

Add **11.2.4** as follows:

11.2.4 Excess Umbrella

Excess Umbrella Insurance may be used to meet the minimum requirements for General Liability and Automobile Liability only.

Add **11.2.5** as follows:

11.2.5 Builder's Risk

Builder's Risk Insurance shall be in an amount equal to the greater of the fully-completed project value or the amount of the construction contract including any amendments and shall be upon the entire Work included in the contract. The policy shall provide coverage equivalent to the ISO form number CP 10 20, Broad Form Causes of Loss (extended, if necessary, to include the perils of wind, earthquake, collapse, vandalism/malicious mischief, and theft, including theft of materials whether or not attached to any structure). The policy must include architects' and engineers' fees necessary to provide plans, specifications and supervision of Work for the repair and/or replacement of property damage caused by a covered peril, not to exceed 10% of the cost of the repair and/or replacement.

Flood coverage shall be provided by the Contractor on the first floor and below for projects North of the Interstate Corridor beginning at the Texas-Louisiana border at Interstate 10 East to the Baton Rouge junction of Interstate 12, East to Slidell junction with Interstate 10 to the Louisiana-Mississippi border. Flood is included in the builder's risk insurance policy, then the sub-limit shall not be less than ten percent (10%) of the total contract cost per occurrence. If flood is purchased as a separate policy, the limit shall be ten percent (10%) of the total contract cost per occurrence (with a max of $500,000 if NFIP). Coverage for roofing only projects shall **not** require flood coverage.

On projects South of this corridor, flood coverage shall be provided by the State of Louisiana as the owner. The Contractor will be liable for the $5,000 policy deductible from the Notice to Proceed date through the date of final payment of the project in the event of a flood loss.

A Specialty Contractor may provide an installation floater in lieu of a Builder's Risk policy, with the similar coverage as the Builder's Risk policy, upon the system to be installed in an amount equal

to the greater of the fully-completed project value or the amount of the contract including any amendments. Flood coverage is not required.

The policy must include coverage for the University, Contractor and any subcontractors as their interests may appear.

Add **11.2.6** as follows:

11.2.6 ***Pollution Liability*** *(required when asbestos or other hazardous material abatement is included in the contract*).

Pollution Liability insurance, including gradual release as well as sudden and accidental, shall have a minimum limit of not less than $1,000,000 per claim. A claims-made form will be acceptable. A policy period inception date of no later than the first day of anticipated Work under this contract and an expiration date of no earlier than 30 days after anticipated completion of all Work under the contract shall be provided. There shall be an extended reporting period of at least 24 months, with full reinstatement of limits, from the expiration date of the policy. The policy shall not be cancelled for any reason, except non-payment of premium.

11.3 OTHER INSURANCE PROVISIONS

Delete **11.3** and replace with the following:

11.3 OTHER INSURANCE PROVISIONS

Delete **11.3.1** and replace with the following:

11.3.1 The policies are to contain, or be endorsed to contain, the following provisions:

Delete **11.3.1.1** and replace with the following:

11.3.1.1 Worker's Compensation and Employer's Liability Coverage

Add **11.3.1.1.1** as follows:

11.3.1.1.1 The insurer shall agree to waive all rights of subrogation against the University, its board, officers, officials, employees and volunteers for losses arising from Work performed by the Contractor for the University.

Delete **11.3.1.2** and replace with the following:

11.3.1.2 General Liability Coverage

Add **11.3.1.2.1** as follows:

11.3.1.2.1 The University, its board, officers, agents, employees, and volunteers are to be added as additional insureds as respects liability arising out of activities performed by or on behalf of the Contractor; products and completed operations of the Contractor, premises owned, occupied or used by the Contractor. ISO Form CF 20 10 (current form approved for use in Louisiana), or equivalent, is to be used.

Add **11.3.1.2.2** as follows:

11.3.1.2.2 The Contractor's insurance shall be primary as respects to University, its board, officers, agents, employees and volunteers. The coverage shall contain no special limitations on the scope of protection afforded to the University, its board, officers, officials, employees or volunteers. Any insurance or self-insurance maintained by the University shall be excess and non-contributory of the Contractor's insurance.

Add **11.3.1.2.3** as follows:

11.3.1.2.3 The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the policy limits.

Delete **11.3.1.3** and replace with the following:

11.3.1.3 Builder's Risk

The policy must include an endorsement providing the following:

In the event of a disagreement regarding a loss covered by this policy which may also be covered by a State of Louisiana self-insurance or commercial property policy through the Office of Risk Management (ORM), Contractor and its insurer agree to follow the following procedure to establish coverage and/or the amount of loss:

Any party to a loss may make written demand for an appraisal of the matter in disagreement. Within 20 days of receipt of written demand, the Contractor's insurer and either ORM or its commercial insurance company shall each select a competent and impartial appraiser and notify the other of the appraiser selected. The two appraisers will select a competent and impartial umpire. The appraisers will then identify the policy or policies under which the loss is insured and, if necessary, state separately the value of the property and the amount of the loss that must be borne by each policy. If the two appraisers fail to agree, they shall submit their differences to the umpire. A written decision by any two shall determine the policy or policies and the amount of the loss. Each insurance company agrees to at the decision of the appraisers and the umpire if involved will be binding and final and that neither party will resort to litigation. Each of the two parties shall pay its chosen appraiser and bear the cost of the umpire equally.

Delete **11.3.1.4** and replace with the following:

11.3.1.4 All Coverages

Add **11.3.1.4.1** as follows:

11.3.1.4 Coverage shall not be canceled, suspended, or voided by either party (the Contractor or the insurer) or reduced in coverage or in limits except after 30 days written notice has been given to the University. Ten-day written notice of cancellation is acceptable for nonpayment of premium. Notifications shall comply with the standard cancellation provisions in the Contractor’s policy.

Add **11.3.1.4.2** as follows:

11.3.1.4.2 Neither the acceptance of the completed Work nor the payment thereof shall release the Contractor from the obligations of the insurance requirements or indemnification agreement.

Add **11.3.1.4.3** as follows:

11.3.1.4.3 The insurance companies issuing the policies shall have no recourse against the University for payment of premiums or for assessments under any form of the policies.

Add **11.3.1.4.4** as follows:

11.3.1.4.4 Any failure of the Contractor to comply with reporting provisions of the policy shall not affect coverage provided to the University, its officers, agents, employees and volunteers.

Delete **11.3.2** and replace with the following:

11.3.2 Acceptability of Insurers

All required insurance shall be provided by a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located. Insurance shall be placed with insurers with an A.M. Best's rating of **A-:VI or higher.** This rating requirement may be waived for the Worker's Compensation coverage only.

If at any time an insurer issuing any such policy does not meet the minimum A.M. Best rating, the Contractor shall obtain a policy with an insurer that meets the A.M. Best rating and shall submit another certificate of insurance as required in the contract.

Delete **11.3.3** and replace with the following:

11.3.3 Verification of Coverage

Contractor shall furnish the University with Certificates of Insurance reflecting proof of required coverage. The Certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. The Certificates are to be received and approved by the University before Wok commences and upon any contract renewal thereafter. The Certificate Holder must be listed as follows:

Board of Supervisors of
Louisiana State University and Agricultural and Mechanical College
Office of Procurement
213 Thomas Boyd Hall
Baton Rouge, LA 70803-3001
Attn: Project # _____

In addition to the Certificates, Contractor shall submit the declarations page and the cancellation provision endorsement for each insurance policy. The University reserves the right to request complete certified copies of all required insurance policies at any time. Upon failure of the Contractor to furnish, deliver and maintain such insurance as above provided, this contract, at the election of the University, may be suspended, discontinued or terminated. Failure of the Contractor to purchase and/or maintain any required insurance shall not relieve the Contractor from any liability of indemnification under the contract.

If the Contractor does not meet the insurance requirements at policy renewal, at the option of the University, payment to the Contractor may be withheld until the requirements have been met, OR

the University may pay the renewal premium and withhold such payment from any monies due the Contractor, OR the contract may be suspended or terminated for cause.

Delete **11.3.4** and replace with the following:

11.3.4 Subcontractors

Contractor shall include all subcontractors as insureds under its policies OR shall be responsible for verifying and maintaining the certificates provided by each subcontractor. Subcontractors shall be subject to all requirements stated herein. The University reserves the right to request copies of subcontractor's certificates at any time.

If Contractor does not verify subcontractors' insurance as described above, University has the right to withhold payments to Contractor until the requirements have been met.

Delete **11.3.5** and replace with the following:

11.3.5 Worker's Compensation Indemnity

Contractor hereby agrees to protect, defend, indemnify and hold the University, its departments, agencies, agents and employees harmless from any worker's compensation claim from any employee of Contractor or one of its subcontractors, that may arise from the performance of this contract.

Delete **11.3.6** and replace with the following:

11.3.6 Indemnification/Hold Harmless Agreement

Contractor agrees to protect, defend, indemnify, save, and hold harmless, the University, its board, officers, agents, servants, employees and volunteers, from and against any and all claims, damages, expenses, attorney's fees and liability arising out of injury or death to any person or the damage, loss or destruction of any property which may occur, to the extent caused by any act, omission, or breach of this Agreement by Contractor, its agents, servants, subcontractors and employees, except and only to the extent those claims, demands, suits or causes of action are caused by the negligence of the University, its officers, agents, servants, employees and volunteers. Contractor agrees to investigate, handle, respond to, provide defense for an defend any such claims demands, suits or causes of action at its sole expense and agrees to bear all other costs and expenses related thereto, even if the claims, demands, suits, or causes of action are groundless, false or fraudulent.

11.4 PERFORMANCE AND PAYMENT BOND

Add **11.4.3** as follows:

11.4.3 Recordation of Contract and Bond [38:2241a(2)]

The Contractor shall record within thirty (30) days the Contract Between Owner and Contactor and Performance and Payment Bond with the Clerk of Court in the Parish in which the work is to be performed.

ARTICLE 12

UNCOVERING AND CORRECTION OF WORK

12.2.1 Before or After Substantial Completion

At the end of **12.2.1.** add the following:

If the Contractor fails to correct Work identified as defective within a thirty (30) day period, through no fault of the Architect, the Owner may hold the Contractor in default. If the Owner finds the Contractor in default, the Surety shall be notified.

If within thirty (30) days after notification, the Surety has not corrected the nonconforming work, through no fault of the Architect or Owner, the Owner may contract to have the nonconforming work corrected and hold the surety and Contractor responsible for the cost, including architectural fees and other indirect costs. If the Surety fails to correct the work within the stipulated time period and fails to meet its obligation to pay the costs, the owner may elect not to accept bonds submitted in the future by the Surety. Finding the Contractor in default shall constitute a reason for disqualification of the Contractor from bidding on future University contracts.

12.2.2 After Substantial Completion

12.2.2.1 Delete the last sentence and add the following:

If the Contractor fails to correct nonconforming Work within a thirty (30) day period, through no fault of the Architect or Owner, the Owner may hold the Contractor in default. If the Owner finds the Contractor is in default, the Surety shall be notified. If within thirty (30) days after notification, the Surety has not corrected the nonconforming Work, through no fault of the Architect or Owner, the Owner may contract to have the nonconforming work corrected and hold the Surety responsible for the cost including architects fees and other indirect costs. Corrections by the Owner shall be in accordance with Section 2.4. If the Surety fails to correct the nonconforming Work within the stipulated time period and fails to meet its obligation to pay the costs, the Owner may not accept bonds submitted, in the future, by the Surety.

12.2.2.2 Delete **12.2.2.2** and replace with the following:

If the Contractor fails to correct Work covered by warranties within a thirty (30) day period, through no fault of the Architect or Owner, the Owner may hold the Contractor in default. If the Owner finds the Contractor is in default, the Surety shall be notified. If within thirty (30) days after notification, the Surety has not corrected the warranty Work, through no fault of the Architect or Owner, the Owner may contract to have the warranty Work corrected and hold the Surety responsible for the cost including Architect's fees and other indirect costs. Corrections by the Owner shall be in accordance with Section 2.4. If the Surety fails to correct the warranty Work within the stipulated time period and fails to meet its obligation to pay the costs, the Owner may not accept bonds submitted, in the future, by the Surety.

ARTICLE 13

MISCELLANEOUS PROVISIONS

13.1 GOVERNING LAW

Delete everything after the word "located".

13.2 SUCCESSORS AND ASSIGNS

13.2.1 In the second sentence, delete "Except as… 13.2.2".

Delete entire **13.2.2**

13.4 RIGHTS AND REMEDIES

Add **13.4.3** as follows:

13.4.3 The Nineteenth Judicial Court in and for the Parish of East Baton Rouge, State of Louisiana shall have sole jurisdiction and venue in any action brought under this Contract.

13.5 TESTS AND INSPECTIONS

In **13.5.1** delete the second sentence and substitute the following:

Tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction shall be made at an appropriate time. Unless otherwise specified, the Contractor shall make arrangements for such tests, inspections and 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 Contactor 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.

Delete the last sentence of **13.5.1**

13.6 INTEREST

Delete **13.6**

13.7 TIME LIMIT ON CLAIMS

Delete **13.7** (See La.R.S. 38:2189)

Add the **13.8.1** as follows:

13.8 LIENS/PRIVILEGES

13.8.1 Contractor shall at all times promptly pay for all services, labor, materials and equipment used or furnished by or through Contractor in the performance of the Work under this Contract,

and shall, at its sole expense, keep the Project and all property belonging to Owner free and clear of any and all liens and claims arising out of services, labor, materials and/or equipment furnished by or through Contractor or its employees, subcontractors, or suppliers in performance of the Work. If Contractor fails to release and discharge any such lien or claim made against the Project or the property of Owner arising out of performance of the Work within seven working days after receipt of written notice from Owner to remove such lien or claims of privilege, Owner may, at its sole option, declare Contractor in default. Contractor shall be liable to Owner, as applicable, for any and all costs and expenses incurred by Owner in resolving lien claims including reasonable attorney fees and court costs. Owner shall be entitled to deduct such costs from payments otherwise due to Contractor as a back charge.

ARTICLE 14

TERMINATION OR SUSPENSION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR

14.1.1 delete **.4** from the list

14.1.3 after the word "profit" add "for Work completed prior to stoppage".

14.2 TERMINATION BY THE OWNER FOR CAUSE

Add **.5** to the list as follows:

.5 failure to complete the punch list within the lien period as provided in 9.8.2.3.

14.2.3 Add the following sentence:

Termination by the Owner shall not suspend assessment of liquidated damages against the surety.

Add **14.2.5** as follows:

14.2.5 If an agreed sum of liquidated damages has been established, termination by the Owner under this Article will not relieve the Contractor and/or surety of his obligations under the liquidated damages provisions and the Contractor and/or surety shall be liable to the Owner for per diem liquidated damages.

ARTICLE 15

CLAIMS AND DISPUTES

15.1 CLAIMS

In the first sentence of **15.1.1**, after the word "money", add the phrase "extension of time,".

15.1.2 Add the following to the end of the paragraph:

A Reservation of Rights and similar stipulations shall not be recognized under this contract as having any effect. A party must make a claim as defined herein within the time limits provided.

15.1.3 In the second sentence, delete "the decisions of the initial Decision Maker" and replace with "his/her decision".

Delete the **15.1.5.2** and replace with the following:

15.1.5.2 If adverse weather conditions are the basis for a claim for additional time, the Contractor shall document that weather conditions had an adverse effect on the scheduled construction. An increase in the contract time due to weather shall not be cause for an increase in the contract sum. At the end of each month, the Contractor shall make one Claim for any adverse weather days occurring within the month. The Claim must be accompanied by sufficient documentation evidencing the adverse days and the impact on construction. Failure to make such Claim within twenty-one (21) days from the last day of the month shall prohibit any future claims for adverse days for that month.

Add **15.1.5.3** as follows:

15.1.5.3 The following are considered reasonably anticipated days of adverse weather on a monthly basis:

January	11 days	July	6 days
February	10 days	August	5 days
March	8 days	September	4 days
April	7 days	October	3 days
May	5 days	November	5 days
June	6 days	December	8 days

The Contractor may ask for total adverse weather days; however, the Contractor's request shall be considered only for days over the allowable number of days stated above. *Note: Contract is on a calendar day basis.*"

Delete **15.1.6** and replace with the following:

15.1.6 Owner shall not be liable to any Subcontractor for claims or damages of any nature caused by or arising out of delays. The sole remedy against the Owner for excusable delays shall be the allowance of additional time for completion of the Work, the amount of which shall be subject to a determination under the claims procedure set forth herein. Furthermore, the Owner shall not be liable to Contractor for consequential damages arising out of this Agreement, including, but not limited to, damages incurred by the Contractor for principal office expenses, such as compensation of personnel stationed there or on the job site, for losses of financing, business and/or reputation, and for loss of profit.

Add **15.1.7** as follows:

15.1.7 Should Owner be compelled to institute legal proceedings to enforce its rights under this Agreement, to the extend the Owner prevails, it shall be entitled to recover its reasonable attorney's fees and court costs from the Contractor.

15.2 INITIAL DECISION

15.2.1 In second sentence delete the word "will" and replace with “shall always”;
delete the phrase "unless otherwise indicated in the Agreement."
In the third sentence, delete the word "mediation" and replace with "litigation"; delete the phrase "unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered."

15.2.5 In the middle of the first sentence, delete everything after the phrase "rejecting the Claim".

In the second sentence, delete the phrase "and the Architect, if the Architect is not serving as the Initial Decision Maker".

In the third sentence, delete everything after "binding on the parties" and add the following "except that the Owner may reject the solution or suggest a compromise or both."

Delete **15.2.6**

Delete **15.2.6.1**

15.3 MEDIATION.

Delete **15.3**

15.4 ARBITRATION

Delete **15.4**

Add **Article 16** as follows:

ARTICLE 16

EQUAL OPPORTUNITY

16.1 The Contractor and all Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex or national origin. The Contractor shall take affirmative action to insure that applicants are employed, and that employees are treated during employment without regard to their race, religion, color, sex, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the policies of nondiscrimination.

16.2 The Contractor and all Subcontractors, shall, in all solicitations or advertisement for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex or national origin.

BID BOND FOR BOARD OF SUPERVISORS OF LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE

Date: _____

KNOW ALL MEN BY THESE PRESENTS:

That _____ of _____, as Principal and _____, as Surety, are held and firmly bound unto the Board of Supervisors of Louisiana State University and Agricultural and Mechanical College (Obligee), in the full and just sum of five (5%) percent of the total amount of this proposal, including all alternates, lawful money of the United States, for payment of which sum, well and truly be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally firmly by these presents.

Surety represents that it is listed on the current U. S. Department of the Treasury Financial Management Service list of approved bonding companies as approved for an amount equal to or greater that the amount for which it obligates itself in this instrument or that it is a Louisiana domiciled insurance company with at least an A- rating in the latest printing of the A. M. Best's Key Rating Guide. If surety qualifies by virtue of its Best's listing, the Bond amount may not exceed ten percent of policyholders' surplus as shown in the latest A. M. Best's Key Rating Guide.

Surety further represents that it is licensed to do business in the State of Louisiana and that this Bond is signed by surety's agent or attorney in fact. This Bid Bond is accompanied by appropriate power of attorney.

THE CONDITION OF THIS OBLIGATION IS SUCH that, whereas said Principal is herewith submitting its proposal to the Obligee on a Contract for:

_____

NOW, THEREFORE, if the said Contract be awarded to the Principal and the Principal shall, within such time as may be specified, enter into the Contract in writing and give a good and sufficient bond to secure the performance of the terms and conditions of the Contract with surety acceptable to the Obligee, then this obligation shall be void; otherwise this obligation shall become due and payable.

_____	_____
PRINICIPAL (BIDDER)	SURETY
BY: _____	_____
AUTHORIZED OFFICER/OWNER/ PARTNER	AGENT OR ATTORNEY IN FACT (SEAL)

CONTRACTOR'S AFFIDAVIT AS REQUIRED BY TITLE 38 LOUISIANA REVISED STATUTES

Louisiana State University
and A & M College
Baton Rouge, Louisiana

I, _____ representing
(Name of Individual)

_____
(Company)

as its _____ certify in compliance with Louisiana
(Title of Position)

R.S. 38:2224 that as Contractor for Louisiana State University and Agricultural and Mechanical College on

Bid # _____ entitled: _____

_____

By: _____
(Architect or Engineer)

that I/we employ no person, corporation, firm, association, or other organization, either directly or indirectly, to secure the contract for the above mentioned public project other than persons regularly employed by affiant, whose services in connection with the construction of the public building or project or in securing the contract for same were in regular course of their duties for affiant; and that no part of the contract price received, or to be received, by affiant was paid or will be paid to any person, corporation, firm, association, or other organization for soliciting the contract, other than the payment of their normal compensation to persons regularly employed by affiant, whose services in connection with the construction of said public project were in the regular course of their duties for affiant.

SWORN TO AND SUBSCRIBED, before me

this _____ day of _____ _____
Signature of Affiant

20 ____.

_____ Seal of Notary

Notary Public

(NOT TO BE SUBMITTED WITH BID)
(SUBMITTED BY ALL BIDDERS WITHIN 10 DAYS AFTER BID OPENING)

AFFIDAVIT

_____

NAME OF PROJECT

Appearer, as a Bidder on the above-entitled Public Works Project, does hereby attest that:

LA. R.S. 38:2212.10 Verification of Employees

A. Appearer is registered and participates in a status verification system to verify that all employees in the state of Louisiana are legal citizens of the United States or are legal aliens.

B. If awarded the contract, Appearer shall continue, during the term of the contract, to utilize a status verification system to verify the legal status of all new employees in the state of Louisiana.

C. If awarded the contract, Appearer shall require all subcontractors to submit to it a sworn affidavit verifying compliance with Paragraphs (A) and (B) of this Subsection.

_____ _____

NAME OF BIDDER **NAME OF AUTHORIZED SIGNATORY OF BIDDER**

_____ _____

DATE **TITLE OF AUTHORIZED SIGNATORY OF BIDDER**

_____

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER

_____

WITNESS

_____

WITNESS

_____

NOTARY PUBLIC

(NOT TO BE SUBMITTED WITH BID)
SUBMIT BY ALL BIDDERS WITHIN 10 DAYS AFTER BID OPENING

_____ _____

NAME OF PROJECT **PROJECT NO.**

ATTESTATIONS

Appearer, as a Bidder on the above-entitled Public Works Project, does hereby attest that:

LA. R.S. 38:2227 PAST CRIMINAL CONVICTIONS OF BIDDERS

A. No sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to any of the following state crimes or equivalent federal crimes:

(a) Public bribery (R.S. 14:118)
(b) Corrupt influencing (R.S. 14:120)
(c) Extortion (R.S. 14:66)
(d) Money laundering (R.S. 14:230)

B. Within the past five years from the project bid date, no sole proprietor or individual partner, incorporator, director, manager, officer, organizer, or member who has a minimum of a ten percent (10%) ownership in the bidding entity named below has been convicted of, or has entered a plea of guilty or nolo contendere to any of the following state crimes or equivalent federal crimes, during the solicitation or execution of a contract or bid awarded pursuant to the provisions of Chapter 10 of Title 38 of the Louisiana Revised Statutes:

(a) Theft (R.S. 14:67)
(b) Identity Theft (R.S. 14:67.16)
(c) Theft of a business record (R.S.14:67.20)
(d) False accounting (R.S. 14:70)
(e) Issuing worthless checks (R.S. 14:71)
(f) Bank fraud (R.S. 14:71.1)
(g) Forgery (R.S. 14:72)
(h) Contractors; misapplication of payments (R.S. 14:202)
(i) Malfeasance in office (R.S. 14:134)

LA. R.S. 38:2212.10 Verification of Employees

C. At the time of bidding, Appearer is registered and participates in a status verification system to verify that all new hires in the state of Louisiana are legal citizens of the United States or are legal aliens.

D. If awarded the contract, Appearer shall continue, during the term of the contract, to utilize a status verification system to verify the legal status of all employees in the state of Louisiana.

E. If awarded the contract, Appearer shall require all subcontractors to submit to it a sworn affidavit verifying compliance with Paragraphs (A) and (B) of this Subsection.

LA. R.S. 23:1726(B) Certification Regarding Unpaid Workers Compensation Insurance

A. R.S. 23:1726 prohibits any entity against whom an assessment under Part X of Chapter 11 of Title 23 of the Louisiana Revised Statutes of 1950 (Alternative Collection Procedures & Assessments) is in effect, and whose right to appeal that assessment is exhausted, from submitting a bid or proposal for or obtaining any contract pursuant to Chapter 10 of Title 38 of the Louisiana Revised Statutes of 1950 and Chapters 16 and 17 of Title 39 of the Louisiana Revised Statutes of 1950.

Name of Project	Project No.

B. By signing this bid /proposal, Affiant certifies that no such assessment is in effect against the bidding / proposing entity.

NAME OF BIDDER	NAME OF AUTHORIZED SIGNATORY OF BIDDER
DATE	TITLE OF AUTHORIZED SIGNATORY OF BIDDER

SIGNATURE OF AUTHORIZED BIDDER

SCHEDULE OF VALUES

The Contractor is to use the following format.
The total Contract Cost is to be itemized in each Subsection listed (as applicable).

DIVISION 01 – GENERAL REQUIREMENT		
01 00 00 General Requirements		$ -
01 32 50 Record Drawings, Shop Drawings, Product Data, Samples and other submittals		$ -
	DIVISION 01 SUB-TOTAL	**$ -**
DIVISION 02 – EXISTING CONDITIONS		
02 30 00 Subsurface Investigation		$ -
02 41 00 Demolition		$ -
	DIVISION 02 SUB-TOTAL	**$ -**
DIVISION 03 – CONCRETE		
03 01 00 Maintenance of Concrete		$ -
03 11 00 Concrete Forming		$ -
03 15 00 Concrete Accessories		$ -
03 20 00 Concrete Reinforcing		$ -
03 30 00 Cast-in-place Concrete		$ -
03 40 00 Precast Concrete		$ -
03 50 00 Cast Decks & Underlayment		$ -
	DIVISION 03 SUB-TOTAL	**$ -**
DIVISION 04 – MASONRY		
04 01 00 Maintenance of Masonry		$ -
04 05 13 Masonry Mortaring		$ -
04 05 19 Masonry Anchorage & Reinforcing		$ -
04 05 23 Masonry Accessories		$ -
04 20 00 Unit Masonry		$ -
	DIVISION 04 SUB-TOTAL	**$ -**
DIVISION 05 – METALS		
05 05 23 Metal Fastenings		$ -
05 10 00 Structural Metal Framing		$ -
05 20 00 Metal Joists		$ -
05 30 00 Metal Decking		$ -
05 50 00 Metal Fabrications		$ -
05 58 00 Formed Metal Fabrications		$ -
	DIVISION 05 SUB-TOTAL	**$ -**
DIVISION 06 – WOOD, PLASTICS, & COMPOSITES		
06 05 23 Fastening and Adhesives		$ -
06 10 00 Rough Carpentry		$ -
06 13 00 Heavy Timber		$ -
06 17 00 Shop-fabricated Structural Wood06 20 00		$ -
06 20 00 Finish Carpentry		$ -
06 40 00 Architectural Woodwork		$ -
06 60 00 Plastic Fabrications		$ -
06 80 00 Composite Fabrications		$ -
	DIVISION 06 SUB-TOTAL	**$ -**

SAMPLE

DIVISION 07 – THERMAL AND MOISTURE PRETECTION

07 10 00	Dampproofing and Waterproofing	$ -
07 18 00	Traffic Coatings	$ -
07 19 00	Water Repellents	$ -
07 21 00	Thermal Insulation	$ -
07 24 00	Exterior Insulation & Finish Systems	$ -
07 25 00	Weather Barriers	$ -
07 31 00	Shingles and Shakes	$ -
07 32 00	Roof Tiles	$ -
07 40 00	Roofing and Siding Panels	$ -
07 50 00	Membrane Roofing	$ -
07 60 00	Flashing and Sheet Metal	$ -
07 61 00	Sheet Metal Roofing	$ -
07 70 00	Roof & Wall Specialties and Accessories	$ -
07 80 00	Fire and Smoke Protection	$ -
07 90 00	Joint Protection	$ -
07 95 00	Expansion Control	$ -
	DIVISION 07 SUB-TOTAL	**$ -**

DIVISION 08 – OPENINGS

08 11 00	Metal Doors and Frames	$ -
08 14 00	Wood Doors	$ -
08 15 00	Plastic Doors	$ -
08 30 00	Specialty Doors and Frames	$ -
08 41 00	Entrances and Storefronts	$ -
08 44 00	Curtain Wall and Glazed Assemblies	$ -
08 51 00	Metal Windows	$ -
08 52 00	Wood Windows	$ -
08 53 00	Plastic Windows	$ -
08 56 00	Special Function Windows	$ -
08 60 00	Roof Windows and Skylights	$ -
08 70 00	Hardware	$ -
08 80 00	Glazing	$ -
08 90 00	Louvers and Vents	$ -
	DIVISION 08 SUB-TOTAL	**$ -**

DIVISION 09 – FINISHES

09 22 00	Supports for Plaster and Gypsum Board	$ -
09 23 00	Gypsum Plastering	$ -
09 24 00	Portland Cement Plastering	$ -
09 29 00	Gypsum Board	$ -
09 30 00	Tiling	$ -
09 50 00	Acoustical Ceilings	$ -
09 54 00	Specialty Ceilings	$ -
09 61 00	Flooring Treatment	$ -
09 62 00	Specialty Flooring	$ -
09 63 00	Masonry Flooring	$ -
09 64 00	Wood Flooring	$ -
09 65 00	Resilient Flooring	$ -
09 66 00	Terrazzo Flooring	$ -
09 68 00	Carpeting	$ -
09 69 00	Access Flooring	$ -
09 97 00	Wall Finishes	$ -
09 91 00	Painting	$ -
09 97 00	Special Coatings	$ -
	DIVISION 09 SUB-TOTAL	**$ -**

SAMPLE

DIVISION 10 – SPECIALTIES

10 11 00	Visual Display Surfaces	$ -
10 14 00	Signage	$ -
10 21 00	Compartments and Cubicles	$ -
10 22 00	Partitions	$ -
10 26 00	Wall and Door Protection	$ -
10 28 00	Toilet, Bath, and Laundry Accessories	$ -
10 44 00	Fire Protection Specialties	$ -
10 51 00	Lockers	$ -
10 56 00	Storage Assemblies	$ -
10 82 00	Grilles and Screens	$ -
	DIVISION 10 SUB-TOTAL	**$ -**

DIVISION 11 – EQUIPMENT

11 15 00	Security, Detention, and Banking Equipment	$ -
11 19 00	Detention Equipment	$ -
11 23 00	Commercial Laundry and Dry Cleaning Equipment	$ -
11 26 00	Unit Kitchens	$ -
11 27 00	Photographic Processing Equipment	$ -
11 40 00	Foodservice Equipment	$ -
11 51 00	Library Equipment	$ -
11 52 00	Audio-Visual Equipment	$ -
11 53 00	Laboratory Equipment	$ -
11 61 00	Theater and Stage Equipment	$ -
11 65 00	Athletic and Recreational Equipment	$ -
11 70 00	Healthcare Equipment	$ -
	DIVISION 11 SUB-TOTAL	**$ -**

DIVISION 12 – FURNISHINGS

12 20 00	Window Treatments	$ -
12 30 00	Casework	$ -
12 40 00	Furnishings and Accessories	$ -
	DIVISION 12 SUB-TOTAL	**$ -**

DIVISION 13 –SPECIAL CONSTRUCTION

13 10 00	Special Facility Components	$ -
13 34 00	Fabricated Engineered Structures	$ -
13 49 00	Radiation Protection	$ -
	DIVISION 13 SUB-TOTAL	**$ -**

DIVISION 14 – CONVEYING EQUIPMENT

14 20 00	Elevators	$ -
14 30 00	Escalators and Moving Walks	$ -
14 40 00	Lifts	$ -
14 80 00	Scaffolding	$ -
	DIVISION 14 SUB-TOTAL	**$ -**

DIVISION 21 – FIRE SUPPRESSION

21 10 00	Water-Based Fire-Suppression Systems Piping	$ -
21 20 00	Fire-Extinguishing Systems	$ -
21 30 00	Fire Pumps	$ -
	DIVISION 21 SUB-TOTAL	**$ -**

DIVISION 22 – PLUMBING

22 07 00	Plumbing Insulation	$ -
22 11 00	Facility Water Distribution	$ -
22 13 00	Facility Sanitary Sewerage	$ -
22 14 00	Facility Storm Drainage	$ -
22 30 00	Plumbing Equipment	$ -
22 40 00	Plumbing Fixtures	$ -
	DIVISION 22 SUB-TOTAL	**$ -**

SAMPLE

DIVISION 23 – HEATING, VENTILATING, & AIR CONDITIONING

23 05 93	Testing, Adjusting, & Balancing for HVAC	$ -
23 07 00	HVAC Insulation	$ -
23 09 00	Instrumentation & Control for HVAC	$ -
23 13 00	Facility Fuel-Storage Tanks	$ -
23 20 00	HVAC Piping and Pumps	$ -
23 30 00	HVAC Air Distribution	$ -
23 40 00	HVAC Air Cleaning Devices	$ -
23 50 00	Central Heating Equipment	$ -
23 60 00	Central Cooling Equipment	$ -
23 70 00	Central HVAC Equipment	$ -
	DIVISION 23 SUB-TOTAL	**$ -**

DIVISION 26 – ELECTRICAL

26 09 00	Instrumentation & Control for Electrical Systems	$ -
26 10 00	Medium-Voltage Electrical Distribution	$ -
26 20 00	Low-Voltage Electrical Transmission	$ -
26 27 00	Low-Voltage Distribution Equipment	$ -
26 30 00	Facility Electrical Power Generating & Storage Equipment	$ -
26 40 00	Electrical and Cathodic Protection	$ -
26 50 00	Lighting	$ -
	DIVISION 26 SUB-TOTAL	**$ -**

DIVISION 27 – COMMUNICATIONS

27 10 00	Structured Cabling	$ -
27 20 00	Data Communications	$ -
27 30 00	Voice Communications	$ -
27 40 00	Audio-Video Communications	$ -
27 50 00	Distributed Communications & Monitoring Systems	$ -
	DIVISION 27 SUB-TOTAL	**$ -**

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

28 10 00	Electronic Access Control & Intrusion Detection	$ -
28 20 00	Electronic Surveillance	$ -
28 30 00	Electronic Detection and Alarm	$ -
28 40 00	Electronic Monitoring and Control	$ -
	DIVISION 28 SUB-TOTAL	**$ -**

DIVISION 31 – EARTHWORK

31 10 00	Site Clearing	$ -
31 20 00	Earth Moving	$ -
31 31 00	Soil Treatment	$ -
31 32 00	Soil Stabilization	$ -
31 40 00	Shoring and Underpinning	$ -
31 50 00	Excavation Support and Protection	$ -
31 60 00	Special Foundations and Load-Bearing Elements	$ -
	DIVISION 31 SUB-TOTAL	**$ -**

DIVISION 32 – EXTERIOR IMPROVEMENTS

32 10 00	Bases, Ballasts, and Paving	$ -
32 30 00	Site Improvements	$ -
32 90 00	Planting	$ -
	DIVISION 32 SUB-TOTAL	**$ -**

	TOTAL	**$ -**

EXAMPLE

DIVISION 01
GENERAL REQUIREMENTS

CONTENTS

01 11 00	Summary of the Work
01 14 00	Contractor's Use of the Premises
01 15 20	Application for Payment
01 23 00	Base Bid and Alternates
01 30 00	Administrative Requirements
01 31 19	Project Meetings
01 32 16	Construction Progress Schedule
01 33 00	Submittal Procedures
01 35 43	Environmental Procedures
01 40 00	Quality Requirements
01 42 19	Reference Standards
01 50 00	Temporary Facilities and Controls
01 66 00	Product Storage and Handling Requirements
01 73 29	Cutting and Patching
01 74 23	Final Cleaning
01 77 00	Contract Closeout Procedures
01 78 23	Operation and Maintenance Data
01 78 39	Project Record Documents

SECTION 01 11 00

SUMMARY OF THE WORK

PART 1 GENERAL

1.1 SCOPE

This Project Manual and accompanying Drawings provide for labor, materials, plant, supplies, equipment, facilities and appurtenances necessary for preparation of and work necessary for construction and completion of the project titled, **Renovations to A.C. Buchanan Building LSUA, , ALEXANDRIA, LOUISIANA**, complete and in accordance with all requirements of the Contract Documents.

1.2 PROJECT DESCRIPTION

A. SUMMARY:

1. Renovations to an existing two-story building.
2. Building structure is a combination of pre-cast concrete columns and cast in place floor/roof slabs and beams.
3. Interior finishes are painted plaster, gypsum board walls, LVT and carpet tile flooring, and suspended acoustic ceiling.
4. Entry Foyer and Storage Closets are separated with one hour fire rated construction.
5. Re-roofing will be a separate project.
6. Lighting is primarily existing to remain, with limited new lay-in LED.
7. HVAC is primarily existing to remain, with some new work done under a separate project DX split system.
8. Certain relocation of underground utilities is included in the adjacent Health Services Center (HSC) project.
9. Associated site paving and drainage is included in the adjacent Health Services Center (HSC) project.

B. Work identified as Additive Alternates are discussed in Section 01 23 00 and indicated on the Drawings. Contractor shall clarify that his understanding of the extent of the Alternates is complete by careful review of the Drawings.

C. Erect and maintain all required temporary walls, lights, barricades and warning signs, as may be necessary to protect the public and workmen.

D. Contractor shall become familiar with and at all times shall observe and comply with all Federal, State and Local laws and/or ordinances and regulations in any manner affecting the conduct of the work.

E. Contractor shall meet and coordinate with the work at the adjacent HSC project, no less than once per week.

F. Contractor shall make all reasonable efforts to complete the interior work for the Dental Clinic prior to August 5, 2026.

END OF SECTION

SECTION 01 14 00

CONTRACTOR'S USE OF THE PREMISES

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: This section applies to situation in which the Contractor or his representatives including, but not necessarily limited to, suppliers, subcontractors, employees and field engineers, enter upon the User Agency's property.

B. Related work: Documents affecting work of this Section include, but are not limited to, General Conditions, Supplementary Conditions and Sections of Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

A. Promptly upon award of the Contract, notify all pertinent personnel regarding requirements of this Section.

1.3 SCOPE

A. Owner, Architect and Contractor will meet to determine extent of site available for Contractor's use for storage of materials, parking and construction area. It is the intent of this project to work only in those areas and in no way disturb the remaining portions of the building site or campus. Locations for storage of materials are primarily on the parking lot (on the older pavement), located to the east of the project site.

B. Contractor to prepare with Architect a procedure for his use of the premises for storage, personnel, etc., prior to start of work.

C. No after hours access to the site is permitted unless specifically approved by the Architect and coordinated with the User Agency. No work shall be done by Subcontractors without the direct supervision of General Contractor's Job Superintendent.

D. Due to the location of the project on an occupied campus, it will be necessary to restrict and control all parking and entry into the site to only that necessary to accomplish the work. No parking is allowed except in the designated parking lot.

E. Parking of Contractor's employees automobiles is to be the responsibility of Contractor and shall follow all regulations and ordinances controlling such. At no time shall any vehicles restrict or prevent public use of street or entry or present a nuisance to the general public. Locations for Contractor's parking are to be at a designated portion of the parking lot (on the older pavement) located to the east of the project site.

F. It is the intent to minimize inconvenience to students and staff by vehicular traffic and deliveries related to construction activities and to maintain safety for residents and staff from such traffic. Entrance into the project site and a construction route for deliveries and removing demolished materials will be through front gate, on existing roads, but roads shall not be blocked to traffic at any time.

G. At each day's end Contractor to secure all portions of the work and all entry into the building so as to maintain property security requirements. Contractor and Architect to arrange such security requirements prior to start of work under the direction of User Agency.

H. No Contractor equipment, such as “skytrack”, shall be left near the building when Contractor is not working. All equipment shall be returned to its designated parking area at the end of the Contractor’s work day. The key for any equipment or vehicle shall not be left with the vehicle or equipment.

I. All sidewalks, steps, access drives associated with the campus shall remain open and clear to allow traffic at all times.

J. Contractor shall take photographs of the existing site conditions prior to start of work. At the completion of the project, Contractor shall repair all damage to the site caused by construction activities. Extent of repairs shall return site to conditions existing prior to start of work.

END OF SECTION

SECTION 01 15 20

APPLICATION FOR PAYMENT

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: Comply with procedures described in this Section when applying for progress payment and final payment under the Contract.

B. Related Work:
   1. Documents affecting work of this Section included, but are not necessarily limited to General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
   2. The Contract Sum and the schedule for payments are described in the Form of Agreement.
   3. Payments upon Substantial Completion and Completion of the Work are described in the General Conditions and in Section 01 77 00 of these Specifications.

1.2 QUALITY ASSURANCE

A. Prior to start of construction, secure the Architect's approval of the schedule of values required to be submitted under Paragraph 9.2 of the General Conditions.

B. During progress of the work, modify the schedule of values as approved by the Architect to reflect changes in the Contract Sum due to Change Orders or other modifications of the Contract.

C. Base requests for payment on the approved schedule of values.

1.3 SUBMITTALS

A. Formal Submittal: Unless otherwise directed by the Architect:
   1. Make formal submittal of request for payment by filling in the agreed data, by the fillable form, typewriter, or neat lettering in ink, on Facility Planning & Control "Application and Certificate for Payment", and Continuation Sheet.
   2. Sign the Application and Certificate for Payment, in blue ink. Please note that the application does not need to be notarized.
   3. Submit one (1) original of the Application and Certificate for Payment, either paper copy or digital copy.
   4. Contractor can only invoice for materials stored on the site. Contractor may not invoice for materials stored in a bonded warehouse or elsewhere.
   5. Contractor must include copies of supportive invoices and other documentation for any stored materials included in the application.
   6. Contract must include an updated copy of the Construction Schedule with each application.
   7. The Architect will review the formal submittal and, when approved, will sign the Application and Certificate for Payment, and will forward to FP&C for processing.
   8. Owner will, upon approval, disburse payment directly to the Contractor.

END OF SECTION

SECTION 01 23 00

BASE BID AND ALTERNATES

PART 1 GENERAL

1.1 METHOD OF BIDDING

A. Base Bids will be received for all work necessary to complete the project entitled: **Renovations to A.C. Buchanan Building LSUA, ALEXANDRIA, LOUISIANA**, as shown on Drawings and Specifications; exclusive of the Alternates, which are described below.

1.2 BASE BID

A. All work indicated in Contract Documents and as required for construction of a complete project.

1.3 ALTERNATES

A. Alternate Number One (1)
Provide all labor and materials to change the following:
1. Remove existing carpet and base. Install new carpet and base, as per Specifications and Drawings.
2. Remove existing resilient flooring and base. Install new resilient flooring and base, as per Specifications and Drawings.

B. Alternate Number Two (2)
Provide all labor and materials to change the following work:
1. Construct new wall between Waiting 102 and Dental Clinic 105 from floor up to bottom of existing ceiling, in lieu of partial height wall, suspended acoustic ceiling, associated wood trim and lighting.
2. Install curtain wall window system with arch windows at top in lieu of storefront window system, support beam, and metal panel arch infill at top, all locations.

C. Alternate Number Three (3)
Provide all labor and materials to add the following work:
1. Remove raised concrete/terrazzo terrace along Eighth and Jackson Streets. Finish grade existing soil to drain from building to sidewalk.
2. Remove existing pole and sign. Replace with new free standing monument sign as per Drawings and Specifications.
3. Replace all existing aluminum mini-blinds with new window blinds as per Specifications.
4. Demolish walls and door, then install new wall and door to create I.T. 128.
5. Demolish wall and door, then install new door for door mark 127B.

END OF SECTION

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Coordination.

1.2 COORDINATION

A. Coordinate scheduling, submittals, and Work of the various Sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

C. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

D. In finished areas, except as otherwise noted, conceal pipe, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.

E. Coordinate completion and clean up of Work of separate Sections in preparation for Substantial Completion.

F. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 31 19

PROJECT MEETINGS

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: To enable orderly review during progress of the work, and to provide for systematic discussion of problems, the Architect will conduct project meetings throughout the construction period.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
2. The Contractor's relations with his subcontractors and materials suppliers, and discussions relative thereto, are the Contractor's responsibility and normally are not part of project meetings content.

1.2 QUALITY ASSURANCE

A. For those persons designated by the Contractor to attend and participate in project meetings, provide required authority to commit the Contractor to solutions agreed upon in the project meetings.

1.3 SUBMITTALS

A. Agenda items: To the maximum extent practicable, advise the Architect at least 24 hours in advance of project meetings regarding items to be added to the agenda.

B. Minutes:
1. The Architect will compile minutes of each project meeting, and will furnish a copy to the LSUA Project Manager, and the Contractor.
2. Recipients of copies may make and distribute such other copies as they wish.

PART 2 PRODUCTS

(No products are required in this Section)

PART 3 EXECUTION

3.1 PROJECT MEETING SCHEDULE

A. Except as noted below for Preconstruction Conference, project meetings with the LSUA Project Manager will be held monthly. One additional meeting will be held each month with the User Agency, Contractor, and Architect. A date and time schedule for these meetings will be established at the Pre-Construction Conference.

B. Coordinate as necessary to establish a mutually acceptable schedule for meetings.

C. Contractor and Architect shall meet weekly; Architect will submit reports to LSUA.

3.2 PROJECT MEETING LOCATION

A. The Architect will establish the meeting location. To the maximum extent practicable, meetings will be held at the job site.

3.3 PRE-CONSTRUCTION CONFERENCE

A. Pre-Construction Conference will be scheduled to be held within fifteen (15) working days after the Owner has issued the Notice to Proceed.

1. The meeting will be attended by representatives of the User Agency, the Architect, and the Contractor.

3.4 PROJECT MEETINGS

A. Attendance:

1. To the maximum extent practicable, assign the same person or persons to represent the Contractor at project meetings throughout the process of the work.
2. Subcontractors, materials suppliers and others may be invited to attend those project meetings in which their aspect of the work is involved.

B. Minimum Agenda:

1. Review, revise as necessary, and approve minutes of previous meetings.
2. Review progress of the work since last meetings, including status of submittals for approval.
3. Identify problems which impede planned progress.
4. Develop corrective measures and procedures to regain planned schedule.
5. Complete other current business.

C. Revisions to Minutes:

1. Unless published minutes are challenged in writing prior to the next regularly scheduled progress meeting, they will be accepted as properly stating the activities and decisions of the meeting.
2. Persons challenging published minutes shall reproduce and distribute copies of the challenge to all indicated recipients of the particular set of minutes.
3. Challenge to minutes shall be settled as priority portion of "old business" at the next regularly scheduled meeting.

END OF SECTION

SECTION 01 32 16

CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: To assure adequate planning and execution of all demolition and construction work so that the project is completed within the Contract Time, and so that User can maintain normal operations and plan accordingly as outlined below, the below listed construction schedule sequence is to be followed throughout the duration of the project.

It is the responsibility of the Contractor to insure that all Sub-Contractors are familiar with the schedule sequence, as well as the coordination of all Sub-Contractor work as related to the schedule.

B. Related work:
1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
2. Requirements for progress schedule: General Conditions.
3. Construction period: Form of Agreement.

C. Definitions:
1. "Day" as used throughout the Contract, unless otherwise stated, means "calendar day".

D. Daily work hours allowed at LSUA are 7:30 AM to 4:00 PM without prior approval to do otherwise. User Agency will allow work to start as early as 4:00 AM with prior approval. Coordinate with Designer and User Agency if additional access to the Campus is required during construction.

PART 2 EXECUTION

2.1 SCHEDULE SEQUENCE

A. Prior to start of construction Contractor, Owner, User Agency, and Architect shall finalize details of this Construction Progress Schedule, including number of days, so that User Agency can plan accordingly for the continued operation of their facilities.
B. Work shall be planned so that interior work related to the Dental Clinic will be substantially complete no later than August 5, 2026.
C. Exterior work including replacement of window glazing, shall occur after August 5, 2026.

2.2 PERIODIC REPORTS

A. Architect will require periodic reports of adherence to the above described Construction Progress Schedule so as to verify progress as per schedule.

B. Overall Schedule will be updated at each monthly progress meeting.

2.3 REVISIONS

A. Make only those revisions to the above described Construction Progress Schedule as agreed to in advance by the Owner and the Architect.

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: Make submittals required by the Contract Documents, and revise and resubmit as necessary to establish compliance with the specified requirements.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
2. Individuals requirements for submittals also may be described in pertinent Sections of these Specifications.

C. Work not included:

1. Unrequired submittals will not be reviewed by the Architect.
2. The Contractor may require his Subcontractors to provide drawings, setting diagrams and similar information to help coordinate the Work, but such data shall remain between the Contractor and his Subcontractors and will not be reviewed by the Architect.

1.2 QUALITY ASSURANCE

A. Coordination of submittals:

1. Prior to each submittal, carefully review and coordinate all aspects of each items being submitted.
2. Verify that each item and the submittal for it conform in all respects with the specified requirements.
3. By affixing the Contractor's signature to each submittal, certify that this coordinate has been performed.

B. Substitutions:

1. Refer to INSTRUCTIONS TO BIDDERS, ARTICLE 4, Section 4.3 for description of procedure to be followed for any Substitutions.
2. Substitutions must be approved prior to bid according to the requirements of Paragraph 4.3, Instructions to Bidders.
3. Use "Substitution Request Form" provided in this section.

C. "Or Equal"

1. Where the Phrase "or equal" or "or equal as approved by Architect", occurs in the Contract Documents, do not assume that the materials, equipment, or methods will be approved as equal unless the item has been specifically so approved for this Work by the Architect, prior to bidding.
2. The decision of the Architect shall be final and shall be set forth in an addendum.

1.3 SUBMITTALS

A. Make submittals of Shop Drawings, Samples, substitution requests and other items in accordance with the provision of this Section, or as requested by Architect.

PART 2 PRODUCTS

2.1 SHOP DRAWINGS

A. Scale and measurements: Make Shop Drawings accurately to a scale sufficiently large to show all pertinent aspects of the item and its method of connection to the Work.

B. Types of prints required:

1. Submit Shop Drawings in the form of clear readable prints. Submit a minimum of three (3) full copies of all shop drawings.
2. Digital submittals are acceptable via email.

C. Review comments of the Architect and his Consultants will be shown on the prints in red ink when it is returned to the Contractor. The Contractor may make and distribute such copies as are required for his purposes.

2.2 MANUFACTURERS' LITERATURE

A. Where contents of submitted literature from manufacturer include data not pertinent to the submittal, clearly shown which portions of the contents is being submitted for review.

B. Submit the number of copies which are required to be returned, plus one copy which will be retained by the Architect.

2.3 SAMPLES

A. Provide Sample or Samples identical to the precise article proposed to be provided. Identify as described under "Identification of Submittals" below.

B. Number of Samples required:

1. Unless otherwise specified, submit Samples in the quantity which is required to be returned, plus one which will be retained by the Architect.
2. By pre-arrangement in specific cases, a single Sample may be submitted for review and, when approved, be installed in the Work at a location agreed upon by the Architect.

2.4 COLORS AND PATTERNS

A. Unless the precise color and pattern is specifically called out in the Contract Documents, and whenever a choice of color or pattern is available in the specified products, submit accurate color and pattern charts to the Architect for selection.

B. Architect shall prepare selections for approval by the User Agency. User Agency shall sign/date selection prior to Contractor ordering materials.

2.5 CONTRACTOR COST INFORMATION

A. As part of Pre-Construction Conference Submittals, submit the following:

1. Fixed job site overhead cost itemized with documentation to support daily rates.
2. Bond premium rate with supporting information from the Contractor's carrier.
3. Labor Burden, by trade, for Contractor. The Labor Burden shall be supported by the Worker's Compensation and Employer's Liability Insurance Policy Information page. See the sample format for this information which accompanies this section.
4. Internal rate charges for all significant company-owned equipment.
5. Equipment rental costs with supporting data from at least two (2) sources.

B. This submittal must be approved by Designer and LSUA prior to processing of Contractor's pay applications.

C. Also, as part of Pre-Construction Conference Submittals, submit the following:

1. Construction Schedule

2. Schedule of Values

3. List of Subcontractors

4. List of Major Suppliers

5. Contact information for full-time project superintendent

PART 3 EXECUTION

3.1 IDENTIFICATION OF SUBMITTALS

A. Consecutively number all submittals.

1. When material is resubmitted for any reason, transmit under a new letter of transmittal and with a new transmittal number.
2. On resubmittals, cite the original submittal number of reference.

B. Accompany each submittal with a letter of transmittal showing all information required for positive identification and checking. General Contractor shall review, stamp, date and sign all shop drawing submittals.

C. On at least the first page of each submittal, and elsewhere as required for positive identification, show the submittal number in which the item was included.

D. Maintain an accurate submittal log for the duration of the Work, showing current status of all submittals at all times. Make the submittal log available to the Architect for his review upon request.

3.2 GROUPING OF SUBMITTALS

A. Unless otherwise specified, make submittals in groups containing all associated items to assure that information is available for checking each item when it is received.

1. Partial submittals may be rejected as not complying with the provisions of the Contract.
2. The Contractor may be held liable for delays so occasioned.

3.3 TIMING OF SUBMITTALS

A. Make submittals far enough in advance of scheduled dates for installation to provide time required for reviews, for securing necessary approvals, for possible revisions and resubmittals, and for placing orders and securing delivery.

B. In scheduling, allow at least fifteen (15) working days for review by the Architect following receipt of the submittal.

3.4 ARCHITECT'S REVIEW

A. Review by the Architect does not relieve the Contractor from responsibility for errors which may exist in the submitted data.

B. Revisions:

1. Make revisions required by the Architect.
2. If the Contractor considers any required revision to be a change, the Architect shall be notified as provided for in Paragraph 7.3 of the General Conditions.
3. Make only those revisions directed or approved by the Architect.

SUBSTITUTION REQUEST FORM

Project: RENOVATIONS TO A.C. BUCHANAN BUILDING
LOUISIANA STATE UNIVERSITY AT ALEXANDRIA
Alexandria, Louisiana 71302
(Architect's Project Number: 2024.33)

Email To: Jim Weinzettle
jimweinzettle@abwarchitects.com

Telephone: (318) 473-0252 Fax: (318) 442-6007

SECTION _____ PARAGRAPH _____ SPECIFIED ITEM: _____
PROPOSED SUBSTITUTE: _____
Attach complete description, designation, catalog or model number, Spec Data sheet, and other technical data, including laboratory tests if applicable.

Fill In Blanks Below:

1. Will substitution affect dimensions indicated on drawings? _____
_____

2. Will substitution affect wiring, piping, ductwork, etc., indicated on drawings? _____
_____

3. What affect will substitution have on other trades? _____
_____

4. Differences between proposed substitution and specified item? _____
_____

5. If necessary, will the undersigned pay for Architect's cost, required to revise working drawings, caused by substitution? _____

6. Manufacturer's warranties of specified items and proposed items are:
[ ] Same [ ] Different (explain) _____

Submitted By:
Firm: _____

Address: _____

_____

_____
Signature

Date: _____
Telephone: _____
Fax: _____

Electronic File Request and Release Form

Project: RENOVATIONS TO A.C. BUCHANAN BUILDING
LOUISIANA STATE UNIVERSITY AT ALEXANDRIA
Alexandria, Louisiana 71302
(Architect's Project Number: 2024.33)

Email To: Jim Weinzettle
jimweinzettle@abwarchitects.com

Telephone: (318) 473-0252 Fax: (318) 442-6007

At your request, we will provide electronic files for your convenience and use in the preparation of shop drawings related to the above referenced project, the RECIPIENT agrees to the following terms and conditions:

Ashe Broussard Weinzettle Architects will provide to the RECIPIENT certain drawings, specifications, or other documents prepared by Ashe Broussard Weinzettle Architects or its sub consultants in electronic format and/or on electronic media. These documents are hereinafter collectively referred to as "ELECTRONIC FILES". Our ELECTRONIC FILES are compatible with: Autodesk Autocad 2010 and legacy formats. We make no representation as to the compatibility of these files with the RECIPIENT'S hardware or your software beyond the specified release of the referenced specifications.

Data contained on these ELECTRONIC FILES are part of our instruments of service and shall not be used by the RECIPIENT or anyone else receiving these data through or from the RECIPIENT for any purpose other than those outlined for the referenced project. Any other use or reuse by the RECIPIENT or by others will be at the RECIPIENT'S sole risk and without liability or legal exposure to Ashe Broussard Weinzettle Architects or its sub consultants. The RECIPIENT agrees to make no claim and hereby waive, to the fullest extent permitted by law, any claim or cause of action of any nature against Ashe Broussard Weinzettle Architects, our partners, employees, agents, or sub consultants that may arise out of, or in connection with, the RECIPIENT'S use of the ELECTRONIC FILES.

Furthermore, the RECIPIENT shall, to the fullest extent permitted by law, indemnify and hold us harmless against all damages, liabilities or costs, including reasonable attorneys' fees and defense costs, arising out of or resulting from the RECIPIENT'S use of these ELECTRONIC FILES.

These ELECTRONIC FILES are not construction documents or record documents of as-built conditions. Differences may exist between these ELECTRONIC FILES, site conditions and signed or sealed hard-copy construction documents. We make no representation regarding the accuracy or completeness of the ELECTRONIC FILES the RECIPIENT receives. In the event that a conflict arises between the signed or sealed hard-copy construction documents prepared by us and the ELECTRONIC FILES, the signed or sealed hard-copy construction documents shall govern. The RECIPIENT is responsible for determining if any conflict exists. By the use of these ELECTRONIC FILES, the RECIPIENT is not relieved of their duty to fully comply with the contract documents, including, and without limitation, the need to check, confirm and coordinate all dimensions and details, take field measurements, verify field conditions and coordinate work with that of other contractors for the project.

Because information presented on the ELECTRONIC FILES can be modified, unintentionally or otherwise, we reserve the right to remove all indication of ownership and/or involvement from each electronic display.

We will furnish you electronic files of the following drawings:

We make no warranties, either express or implied, of merchantability and fitness for any particular purpose. In no event shall we be liable for any loss of profit or any consequential damages as a result of your use, reuse or misuse of these electronic files.

Please execute this Agreement in the space provided below to indicate your acceptance of the terms and conditions of the release in this Agreement. Upon receipt of the executed Agreement, we will transfer the ELECTRONIC FILES to the appropriate address or email.

READ AND ACCEPTED BY:

Signature of Authorized Representative: _____

Date: _____

Printed Name: _____

Company: _____

Title: _____

END OF SECTION

SECTION 01 35 43

ENVIRONMENTAL PROTECTION

PART 1 GENERAL

1.1 DESCRIPTION

A. For the purpose of this specification, environmental pollution is defined as the presence of chemical, physical or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic and recreational purposes. The control of environmental pollution requires consideration of, but is not limited to air, water and land, and involves noise, solid waste management and management of radioactive and other hazardous materials.

B. See Appendix A in these Specifications for information regarding guidelines for removal of Asbestos-Containing Roofing Materials.

1.2 APPLICABLE REGULATIONS

A. In order to prevent, and to provide for abatement and control any environmental pollution arising from the construction activities of the Contractor and his/her Subcontractors in the performance of this contract, they shall comply with the current applicable federal, state and local laws and regulations concerning environmental pollution control and abatement.

B. The Contractor shall comply with LA-DEQ requirements for storage, transportation, and disposal of all materials removed from the roof. It is the responsibility of the Contractor to contact the appropriate DEQ office.

C. Roofing Contractor shall comply with NCRA and OSHA Agreement for removal of roofing materials containing asbestos. See Appendix A of these Specifications for further information.

D. Roofing Contractor shall conduct all required employee training. Contractor shall provide all required roofing crew training and competent person certificates.

1.3 PROTECTION OF LAND RESOURCES

A. It is intended that the land resources within the project boundaries and outside of limits of permanent work performed under this Contract be preserved in their present condition or be restored to a condition after completion of construction that will appear to be natural and not detract from the appearance of the Project. Insofar as possible, the contractor shall confine his/her construction activities to areas defined by the plans or specifications, to areas to be cleared by other operations, or to quarry, borrow or waste areas indicated on the plans. At the onset of borrow excavation, topsoil shall be saved for use in restoring the borrow area. Waste and borrow areas shall be leveled or trimmed to regular lines and shaped to provide a neat appearance. In all instances the restored area shall be well-drained, so as to prevent the accumulation of stagnant water. Except in areas marked on the plans to be cleared, the Contractor shall not deface, injure or destroy trees or shrubs, nor remove or cut them without special authority.

B. Restoration of Landscape Damage: Any trees or other landscape feature scarred or damaged by the Contractor's equipment or operations, shall be restored as nearly as possible to its original condition at the Contractor's expense. The Contracting Officer will decide what method of restoration shall be used and whether damaged trees shall be treated and healed or removed and replaced.

C. Post-Construction Cleanup or Obliteration: The Contractor shall obliterate all signs of temporary construction facilities such as haul roads, work areas, structure, foundations of temporary structure, stockpiles of excess or waste materials, or any other vestiges of construction as directed

by the Contracting Officer. It is anticipated that excavation, filling and plowing of roadways will be required to restore the area to near natural conditions which will permit the growth of vegetation thereon. The disturbed areas shall be graded and filled as necessary, and shall be spread to a depth of approximately four inches over the entire area and the entire Area seeded. Restoration to original contours is required unless otherwise directed by the Contracting Officer.

1.4 PROTECTION OF WATER RESOURCES

A. The Contractor shall not pollute streams, lakes or reservoirs with fuels, oils, bitumens, calcium chloride, acids or other harmful materials. It is the responsibility of the Contractor to investigate and comply with all applicable federal, state, parish and municipal laws concerning pollution of rivers and streams. all work under this Contract shall be performed in such a manner that pollution/pollutants will not be introduced into streams through or adjacent to the project area.

B. Erosion Control: Surface drainage from cuts and fills within the construction limits, whether or note completed and from borrow and waste disposal areas, shall, if turbidity producing materials are present, be held in suitable sedimentation ponds or shall be graded to control erosion within acceptable limits. Temporary erosion and sediment control measures such as berms, dikes, drains or sedimentation basins, required to meet the above standards, shall be provided and maintained until permanent drainage and erosion control facilities are completed and operative. The area of bare soil exposed at any time by construction proletarian should be held to a minimum. Steam crossing by fording with equipment is prohibited. Fills and waste areas shall be constructed by selective placement to eliminate silts or clays on the surface that will erode and contaminate adjacent streams.

C. Spillages: At all times of the year, special measures shall be taken to prevent chemicals, fuels, oils, grease, bituminous materials, waste washings, herbicides and insecticides, and cement drainage from entering surface or ground waters. In the event of a fuel, oil or chemical spill the Contractor will take immediate containment measures to prevent the spill from entering the base drainage system. All spills will be reported immediately to the Authority having jurisdiction.

D. Disposal: Disposal of any materials, wastes, effluents, trash, garbage, oil, grease, on the project site is expressly forbidden. If any waste material is dumped in unauthorized areas, the Contractor shall remove the material and restore the area to the condition of the adjacent undisturbed area at the Contractor's on expense. If necessary, contaminated ground shall be excavated, disposed of as directed by the Contracting Officer and replaced with suitable fill material, compacted and finished with topsoil; all at the expense of the Contractor.

1.5 DISPOSAL OF REMOVED MATERIAL

A. Unless otherwise specified in other sections of these specifications or unless reusable under the terms of this Contract, all removed material shall be disposed of off site. This disposal shall be in accordance with all applicable federal, state, parish and municipal laws.

1.6 PESTICIDES (INSECTICIDES, FUNGICIDES, HERBICIDES)

A. Application of all pesticides shall be accomplished by a certified pest control operator. Delivery and storage of pesticides will be monitored by certified personnel to insure the adequacy of containers and the safe storage of adjacent undisturbed area at the Contractor's own expense. If necessary, contaminated ground shall be excavated, disposed or as directed by the Contracting Officer, and replaced with suitable fill material, compacted and finished with topsoil; all at the expense of the Contractor.

1.7 BURNING

A. No open burning shall be permitted.

1.8 HAZARDOUS MATERIALS

A. The Contractor will comply with all local, state and federal laws pertaining to the protection of the environment and emission of hazardous pollutants in the performance of this Contract. No equipment or components containing polychlorinated biphenyls (PCB) will be allowed.

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Quality assurance and control of installation.

B. References.

C. Field samples.

D. Mock-up.

E. Manufacturers' field services and reports.

1.2 RELATED SECTIONS

A. Section 01 33 00 - Submittals: Submission of Manufacturers' Instructions and Certificates.

B. Section 01 45 29 - Testing Laboratory Services.

C. Section 01 66 00 – Product Storage and Handling Requirements for material and product quality.

1.3 QUALITY ASSURANCE/CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply fully with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform work by persons qualified to produce workmanship of specified quality.

F. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.4 REFERENCES

A. Conform to reference standard by date of issue current on date for receiving bids.

B. Obtain copies of standards when required by Contract Documents.

C. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

D. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.5 TOLERANCES

A. Comply with manufacturers’ tolerances. When manufacturers’ tolerances conflict with

contract documents, request clarification from Architect before proceeding.

B. Adjust products to appropriate dimensions; position before securing products in place.

1.6 FIELD SAMPLES

A. Install field samples at the site as required by individual specifications Sections for review.

B. Acceptable samples represent a quality level for the Work.

C. Where field sample is specified in individual Sections to be removed, clear area after field sample has been accepted by Architect.

1.7 MOCK-UP

A. Assemble and erect specified items, with specified attachment and anchorage devices, flashings, seals, and finishes. Accepted mock-ups shall be comparison standard for remaining work. Mock-ups can be part of the work and can remain in place after review and approval.

D. Where mock-up is specified in individual Sections to be removed, clear area after mock-up has been accepted by Architect.

B. Mock-up Required:
   a. Glazing/aluminum framing: Installed in precast concrete frame including flashing, shims, etc.

1.8 MANUFACTURERS' FIELD SERVICES AND REPORTS

A. When specified in individual specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment and training of maintenance personnel as applicable, and to initiate instructions when necessary.

B. Individuals to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

C. Submit report in duplicate within seven (7) days of observation to Architect for review.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 42 19

REFERENCE STANDARDS

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included:

1. Throughout the Contract Documents, reference is made to codes and standards which establish qualities and types of workmanship and materials, and which establish methods for testing and reporting on the pertinent characteristics.
2. Where materials or workmanship are required by these Contract Documents to meet or exceed the specifically named code or standard, it is the Contractor's responsibility to provide materials and workmanship which meet or exceed the specifically named code or standard.
3. It is also the Contractor's responsibility, when so required by the Contract Documents or by written request from the Architect, to deliver to the Architect all required proof that the materials or workmanship, or both, meet or exceed the requirements of the specifically named code or standard. Such proof shall be in the form requested in writing by the Architect, and generally will be required to be copies of a certified report of tests conducted by a testing agency approved for that purpose by the Architect.

B. Related Work:

1. Related work described elsewhere; e.g., specific naming of codes or standards occurs on the Drawings and in other Sections of these Specifications.

1.2 QUALITY ASSURANCE

A. Familiarity with pertinent codes and standards: In procuring all items used in this work, it is the Contractor's responsibility to verify the detailed requirements of the specifically named codes and standards and to verify that the items procured for this use in this work meet or exceed the specified requirements.

B. Rejection of non-complying items: The Architect reserves the right to reject items incorporated into the work which fail to meet the specified minimum requirements. The Architect further reserves the right, and without prejudice to other recourse the Architect may take, to accept non-complying items subject to an adjustment in the Contract Amount as approved by the Architect and the Owner.

C. Applicable standards listed in these Specifications include, but are not necessarily limited to, standards promulgated by the following agencies and organizations:

1. AASHTO - American Association of State Highway and Transportation Officials, 341 National Press Building, Washington, D.C. 20004
2. ACI - American Concrete Institute, Box 19150 Redford Station, Detroit, Michigan 48129
3. AISC - American Institute of Steel Construction, Inc., 1221 Avenue of the Americas, New York, New York 10020
4. ADAAG Americans with Disabilities Act Accessibility Guidelines
5. ANSI - American National Standards Institute (successor to USASI and ASA), 1430 Broadway, New York, New York 10018
6. ASTM - American Society of Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103
7. AWS - American Welding Society, Inc., 2501 N.W. 7th Street, Miami, Florida 33125

8. AWWA - American Water Works Association, Inc., 6666 West Quincy Avenue, Denver, Colorado 80235
9. CRSI - Concrete Reinforcing Steel Institute, 228 North LaSalle Street, Chicago, Illinois 60610
10. IBC International Building Code, 2009 Edition
11. NEC - National Electrical Code (See NFPA)
12. NEMA - National Electrical Manufacturers Association, 155 East 44th Street, New York, New York 10017
13. NFPA - National Fire Protection Association, 470 Atlantic Avenue, Boston, Massachusetts 02210
14. SDI - Steel Deck Institute, 135 Addison Avenue, Elmhurst, Illinois 60125
15. SSPC - Steel Structures Painting Council, 4400 5th Avenue, Pittsburgh, Pennsylvania 15213
16. UL - Underwriter's Laboratories, Inc., 207 East Ohio Street, Chicago, Illinois 60611
17. USAB - United States Access Board (Americans with Disabilities Act Accessibility Guidelines) 1331 F Street, NW,, Suite 1000, Washington, DC 20004-1111.
18. Fed Specs and Fed Standards - Specifications Sales (3FRI), Building 197, Washington Navy Yard, General Services Administration, Washington, D.C. 20407

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: provide temporary facilities and controls needed for the Work including, but not necessarily limited to:
   1. Sanitary facilities;
   2. Enclosures such as tarpaulins, barricades and canopies;
   3. Utilities

B. Related work:
   1. Documents affecting work of the Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
   2. Except that equipment furnished by Subcontractors shall comply with requirements of pertinent safety regulations, such equipment normally furnished by the individual trades in execution of their own portions of the work is not part of this Section.
   3. Permanent installation and hookup of the various utilities line are described in other Sections.

1.2 PRODUCT HANDLING

A. Maintain temporary facilities and controls in proper and safe condition throughout progress of the Work.

PART 2 PRODUCTS

2.1 UTILITIES

A. Water: Contractor may make arrangements as needed for use of existing water supply, as long as at no time does this use interfere with the User Agency's use of water supply. Contractor may use existing water supply. Water usage shall be coordinated with User Agency.

B. Electrical Power: Contractor shall make arrangements as needed for temporary electrical service for the duration of the Work, if needed, as long as at no time does this use interfere with the User Agency's use of electrical supply. Contractor may use existing electrical supply. Electrical usage shall be coordinated with User Agency.

C. Telephone: Cell phones are acceptable.

D. Temporary Utility Shut-Off: Contractor shall provide 48-hour notice to Designer and User Agency prior to all instances of temporary shut-off of any utility. Contractor shall plan work such that all such shut-off shall occur over weekends or holiday breaks, to limit inconvenience to University operation.

2.2 FIELD OFFICES AND SHEDS

A. Contractor's facilities: not required.

B. Sanitary facilities:
   1. Provide temporary sanitary facilities in the quantity required for use by all personnel.
   2. Maintain in a sanitary condition at all times.
   3. Keep secure at all times after Contractors work day, either locked or behind barricades.

2.3 ENCLOSURES

A. Provide and maintain for the duration of construction all scaffolds, tarpaulins, canopies, warning signs, steps, platforms, bridges and other temporary construction necessary for proper completion of the Work in compliance with pertinent safety and other regulations.

B. All work areas which are used for temporary material storage shall be completely enclosed by a portable fence, minimum 5'-0" high, sufficient to prevent access. Coordinate use of site with adjacent Health Services Center project.

2.4 TEMPORARY FIRE PROTECTION

A. During construction period and until fire protection needs are fulfilled by permanent facilities, provide and maintain types and forms of temporary fire protection needed to protect facilities against fire losses. Store combustible materials in recognized fire-safe locations and containers.

2.5 EQUIPMENT

A. All Contractor's equipment shall be safely stored after work hours out of the way of pedestrian and vehicular traffic.

B. Contractor shall remove all keys from equipment at end of work day. Keys shall never be left with equipment.

PART 3 EXECUTION

3.1 MAINTENANCE AND REMOVAL

A. Maintain temporary facilities and controls as long as needed for safe and proper completion of the Work.

B. Remove such temporary facilities and controls as rapidly as progress of the Work will permit, or as directed by the Architect.

END OF SECTION

SECTION 01 66 00

PRODUCT STORAGE AND HANDLING REQUIREMENTS

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: Protect products scheduled for use in the Work by means including, but not necessarily limited to, those described in this Section.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

A. Include within the Contractor's quality assurance program such procedures as are required to assure full protection of work and materials.

1.3 MANUFACTURER'S RECOMMENDATION

A. Except as otherwise approved by the Architect, determine and comply with manufacturer's recommendations on product handling, storage and protection.

1.4 PACKAGING

A. Deliver products to the job site in their manufacturer's original container, with labels intact and legible.

1. Maintain packaged materials with seals unbroken and labels intact until time of use.
2. Promptly remove damaged material and unsuitable items from the job site, and promptly replace with material meeting the specified requirements, at no additional cost to the Owner.

B. The Architect may reject as non-complying such material and products that do not bear identification satisfactory to the Architect as to manufacturer, grade, quality and other pertinent information.

1.5 PROTECTION

A. Protect finished exterior surfaces, near which equipment and materials are handled.

B. Maintain finished surfaces clean, unmarred and suitably protected until accepted by the Owner.

1.6 REPAIRS AND REPLACEMENTS

A. In the event of damage, promptly make replacements and repairs to the approval of the Architect and at no additional cost to the Owner.

B. Additional items required to secure replacements and to make repairs will not be considered by the Architect to justify an extension in the Contract Time of Completion.

END OF SECTION

SECTION 01 73 29

CUTTING AND PATCHING

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: This Section establishes general requirements pertaining to cutting (including excavating), fitting and patching or the work required to:

1. Make the several parts fit properly;
2. Uncover work to provide for installing, inspection, or both, of ill-timed work;
3. Remove and replace work not conforming to requirements of the Contract Documents; and
4. Remove and replace defective work.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
2. In addition to other requirements specified, upon the Architect's request uncover work to provide for inspection by the Architect of covered work, and remove samples of installed materials for testing.
3. Do not cut or alter work performed under separate contracts without the Architect's written permission.

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 SUBMITTALS

A. Request for Architect's consent:

1. Prior to cutting which effects structural safety, submit written request to Architect for permission to proceed with cutting.
2. Should conditions of the work, or schedule, indicate a required change of materials or methods for cutting and patching, so notify the Architect and secure his written permission and the required Change Order prior to proceeding.

B. Notices to Architect:

1. Prior to cutting and patching performed pursuant to the Architect's instructions, submit cost estimate to the Architect. Secure the Architect's approval of cost estimates and type of reimbursement before proceeding with cutting and patching.
2. Submit written notice to the Architect designating the time the work will be uncovered, to provide for the Architect's observation.

PART 2 PRODUCTS

2.1 MATERIALS

A. For replacement of items removed, use materials complying with pertinent Sections of these Specifications.

2.2 PAYMENT OF COSTS

A. Cutting and patching needed to comply with the Contract Documents is done at no additional cost to the Owner.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Inspect existing conditions, including elements subject to movement or damage during cutting, excavating, patching and backfilling.
2. After uncovering the work, inspect conditions affecting installation of new work.

B. Discrepancies:

1. If uncovered conditions are not as anticipated, immediately notify the Architect and secure needed directions.
2. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION PRIOR TO CUTTING

A. Provide required protection including, but not necessarily limited to, shoring, bracing and support to maintain structural integrity of the work.

3.3 PERFORMANCE

A. Perform required excavating and backfilling as required under pertinent other Sections of these Specifications.

1. Perform cutting and demolition by methods which will prevent damage to other portions of the work and provide proper surfaces to receive installation of remaining and new work.
2. Perform fitting and adjusting of products to provide finished installation complying with the specified tolerances and finishes.

B. All patching work shall include re-finish of surfaces to nearest corner of wall, floor, or ceiling to result in a seamless appearance.

END OF SECTION

SECTION 01 74 23

FINAL CLEANING

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: Throughout the construction period, maintain the buildings and site in a standard of cleanliness as described in this Section.

B. This section applies to Final Cleaning under Phase One work and also Final Cleaning under Phase Two work.

C. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
2. In addition to standards described in this Section, comply with requirements for cleaning as described in pertinent other Sections of these specifications.

D. Section 01 32 16 Construction Progress Schedule.

1.2 QUALITY ASSURANCE

A. Conduct daily inspection, and more often if necessary, to verify that requirements for cleanliness are being met.

B. In addition to the standards described in this Section, comply with pertinent requirements of governmental agencies having jurisdiction.

PART 2 PRODUCTS

2.1 CLEANING MATERIALS AND EQUIPMENT

A. Provide required personnel, equipment and materials needed to maintain the specified standard of cleanliness.

2.2 COMPATIBILITY

A. Use only the cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material.

PART 3 EXECUTION

3.1 PROGRESS CLEANING

A. General:

1. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.
2. Do not allow accumulation of scrap, debris, waste material and other items not required for construction of this Work.
3. At least twice each month, and more often if necessary, completely remove all scrap, debris and waste material from the job site.

4. Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the ecology.

B. Site:

1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris and waste material. Remove such items to the place designated for their storage.
2. Weekly, and more often if necessary, inspect all arrangements of materials stored on the site. Restack, tidy, or otherwise service arrangements to meet the requirements of Subparagraph 3.1-A-1 above.
3. Maintain the site in a neat and orderly condition at all times.

C. Structures:

1. Weekly, and more often if necessary, inspect the structures and pick up all scrap, debris and waste material. Remove such items to the place designated for their storage.
2. Weekly, and more often if necessary, sweep interior spaces clean.
   a. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and a hand-held broom.
3. As required preparatory to installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using equipment and materials required to achieve the necessary cleanliness.

3.2 FINAL CLEANING

A. "Clean", for the purpose of this Article, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.

B. Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris and waste. Conduct final progress cleaning as described in Article 3.1 above.

C. Site:

1. Unless otherwise specifically directed by the Architect, broom clean paved areas on the site and public paved areas adjacent to the site.
2. Completely remove resultant debris.

D. Structures:

1. Exterior:
   a. Visually inspect exterior surfaces and remove all traces of soil, waste materials, smudges and other foreign matter.
   b. Remove all traces of splashed materials from adjacent surfaces.
   c. If necessary to achieve a uniform degree of cleanliness, hose down the exterior of the structure.
   d. In the event of stubborn stains not removable with water, the Architect may require light sandblasting or other cleaning at no additional cost to the Owner.
2. Interior:
   a. Visually inspect interior surfaces and remove all traces of soil, waste materials, smudges and other foreign matter.
   b. Remove all traces of splashed materials from adjacent surfaces.
   c. In the event of stubborn stains not removable with detergent and water, the Architect may require other cleaning methods at no additional cost to the Owner.

3. Glass: Clean inside and outside.
4. Aluminum frames: Clean all aluminum frame surfaces of all dirt, grime, excess caulk sealant, carpet glue, etc.
5. Polished surfaces: To surfaces requiring routine application of buffed polish, apply polish recommended by manufacturer of the material being polished.

E. Schedule final cleaning as approved by the Architect to enable the Owner to accept a completely clean Work.

3.3 CLEANING DURING OWNER'S OCCUPANCY

A. Should the Owner occupy the Work or any portion thereof prior to its completion by the Contractor and acceptance by the Owner, responsibilities for interim and final cleaning shall be as determined by the Architect in accordance with the General Conditions of the Contract.

END OF SECTION

SECTION 01 77 00

CONTRACT CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included:
   1. Provide an orderly and efficient transfer of the completed Work to the Owner.
   2. All closeout procedures as outlined in the Supplementary Conditions are to be followed at the conclusion of construction.

B. Related work:

   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
   2. Activities relative to Contract Closeout are described in, but not necessarily limited to, Paragraphs 9.8, and 9.9 of the General Conditions, as modified by Supplemental Conditions.
   3. "Substantial Completion" is defined in Paragraph 9.8 of the General Conditions, as modified by Supplemental Conditions.

1.2 QUALITY ASSURANCE

A. Prior to requesting inspection by the Architect, use adequate means to assure that the Work is completed in accordance with the specified requirements and is ready for the requested inspection.

1.3 CLOSEOUT PROCEDURES

A. Comply with procedures stated in the Supplementary Conditions of the Contract for Substantial Completion issuance of Recommendation of Acceptance.

B. When Contractor considers Work has reached final completion, submit written certification that Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect's inspection.

C. In addition to submittals required by the condition of the Contract, provide submittals required by governing authorities, and submit a final statement of accounting giving total adjusted Contract Sum, previous payments, and sum remaining due to Contractor.

D. Architect will issue a final Change Order reflecting approved adjustments to Contract Sum not previously made by Change Order.

1.4 FINAL CLEANING

A. Execute prior to final inspection.
B. Remove all waste and surplus materials, rubbish, and construction facilities from the project and from the site. Perform final cleaning just prior to final acceptance. Reclean areas unacceptable to the Architect and/or User Agency.

1.5 WARRANTIES AND BONDS

A. Provide duplicate, original, notarized copies with signatures in blue ink. Execute Contractor's submittals and assemble documents executed by subcontractors, suppliers, and manufacturers. Provide table of contents and assemble in binder with durable plastic cover.

B. Submit material prior to final application for payment.

C. Materials and equipment put into use for the Contractor's convenience or to aid in the completion of the Work will be maintained by the Contractor.

D. Warranties shall not begin on any item in this project until acceptance by the Owner for his beneficial use and shall be the same date as the Date of Acceptance. At the Pre-Close-Out Conference, the Date of Acceptance is to be determined if work is found ready of acceptance consideration.

1.6 SPARE PARTS AND MAINTENANCE MATERIALS

A. Provide products, spare parts, and maintenance materials in quantities specified in each Section, in addition to that used for construction of Work. Coordinate with Owner, deliver to Project Site and obtain receipt prior to final payment.

END OF SECTION

SECTION 01 78 23

OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: To aid the continued instruction of operating and maintenance personnel and to provide a positive source of information regarding the products incorporated into the Work, furnish and deliver the data described in this Section and in pertinent other Sections of these Specifications.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
2. Required contents of submittals also may be amplified in pertinent other Sections of these Specifications.

1.2 QUALITY ASSURANCE

A. In preparing data required by this Section, use only personnel who are thoroughly trained and experienced in operation and maintenance of the described items, completely familiar with the requirements of this Section and skilled in technical writing to the extent needed for communicating the essential data.

1.3 SUBMITTALS

A. Comply with pertinent provisions of Section 01 33 00, Submittal Procedures.

B. Unless otherwise directed in other Sections or in writing by the Architect, submit three (3) copies of the final Manual to the Architect prior to instruction of Owner's operation and maintenance personnel.

PART 2 PRODUCTS

2.1 INSTRUCTION MANUALS

A. Where instruction Manuals are required to be submitted under other Sections of these Specifications, prepare in accordance with the provisions of this Section.

B. Format:

1.	Size:	8-1/2" x 11"
2.	Paper	White bond, at least 20 lb. weight
3.	Text:	Neatly printed (ink-jet or laser)
4.	Drawings:	11" in height preferable; bind in with text; foldout acceptable; larger drawings acceptable but fold to fit within the Manual and provide a drawing pocket inside rear cover or bind in with text.
5.	Flysheets:	Separate each portion of the Manual with neatly prepared flysheets briefly describing contents of the ensuing portion; flysheets may be in color.
6.	Binding:	Use heavy-duty plastic or fiberboard covers with binding mechanism concealed inside the Manual; 3-ring binders will be acceptable; all binding is subject to the Architect's approval.

7. Measurements: Provide all measurements in U. S. Standard units such as feet-and-inches, lbs, and cfm; where items may be expected to be measured within ten years in accordance with metric formula, provide additional measurements in the "international System of Units" (SI).

C. Provide front and back covers and along the spine for each Manual, using durable material approved by the Architect and clearly identified on or through the cover with at least the following information:

OPERATING AND MAINTENANCE INSTRUCTIONS
Baseball/Softball Fieldhouse Construction
Louisiana State University at Alexandria
Alexandria, LA
name of Contractor
general subject of this Manual
space for approval signature of the Architect and approval date

D. Contents: Include at least the following:

1. Neatly typewritten index near the front of the Manual, giving immediate information as to location within the Manual of all emergency information regarding the installation.
2. Complete instructions regarding operation and maintenance of all equipment involved including lubrication, disassembly and reassemble.
3. Complete nomenclature of all parts of all equipment.
4. Complete nomenclature and part number of all replaceable parts, name and address of nearest vendor and all other data pertinent to procurement procedures.
5. Copy of all guarantees and warranties issued.
6. Manufacturer's bulletins, cuts and descriptive data, where pertinent, clearly indicating the precise items included in this installation and clearly, or otherwise clearly indicating, all manufacturers' data with which this installation is not concerned.
7. Such other data as required in pertinent Sections of these Specifications.

PART 3 EXECUTION

3.1 INSTRUCTION MANUALS

A. Preliminary:

1. Prepare a preliminary draft of each proposed Manual.
2. Show general arrangement, nature of contents in each portion, probably number of drawings and their size and proposed method of binding and covering.
3. Secure the Architect's approval prior to proceeding.

B. Final: Complete the Manuals in strict accordance with the approved preliminary drafts and the Architect's review comments.

C. Revisions:

1. Following the indoctrination and instruction of operation and maintenance personnel, review all proposed revisions of the Manual with the Architect.
2. If the Contractor is required by the Architect to review previously approved Manuals, compensation will be made as provided for under "Changes" in the General Conditions.

END OF SECTION

SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included:

1. Throughout progress of the Work, maintain an accurate record of changes in the Contract Documents, as described in Article 3.1 below.
2. Upon completion of the Work, transfer the recorded changes to a set of Record Documents prints, as described in Article 3.2 below.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
2. Other requirements affecting Project Records Documents may appear in pertinent other Sections of these Specifications.

1.2 QUALITY ASSURANCE

A. Delegate the responsibility for maintenance of Record Documents to one person on the Contractor's staff as approved by the Architect.

B. Accuracy of records:

1. Thoroughly coordinate changes within the Record Documents, making adequate and proper entries on each page of Specifications and each sheet of Drawings and other Documents where such entry is required to show the change properly.
2. Accuracy of records shall be such that future search for items shown in the Contract Documents may rely reasonably on information obtained from the approved Project Record Documents.

C. Make entries within 24 hours after receipt of information that the change has occurred.

1.3 SUBMITTALS

A. Comply with pertinent provisions of Section 01 33 00, Submittal Procedures.

B. The Architect's approval of the current status of the Project Record Documents may be a prerequisite to the Architect's approval of requests for progress payment and request for final payment under the Contract.

C. Prior to submitting each request for progress payment, secure the Architect's approval of the current status of the Project Record Documents.

D. Prior to submitting request for final payment, submit the final Project Record Documents to the Architect and secure his approval.

1.4 PRODUCT HANDLING

A. Maintain the job set of Record Documents completely protected from deterioration and from loss and damage until completion of the Work and transfer of all recorded data to the final Project Records Documents.

B. In the event of loss of recorded data, use means necessary to again secure the data to the Architect's approval.

1. Such means shall include, if necessary in the opinion of the Architect, removal and replacement of concealing materials.
2. In such case, provide replacements to the standards originally required by the Contract Documents.

PART 2 PRODUCTS

2.1 RECORD DRAWINGS

A. Contractor Job Set: Promptly following receipt of the Owner's Notice to Proceed, secure from the Architect at no charge to the Contractor one complete set of all Drawings, for the sole purpose of recording a record of changes in the Contract Documents.

B. Contractor Final Record Drawings: At a time nearing the completion of the Work, the Contractor shall secure from the Architect, at no charge to the Contractor, one complete set of all Drawings in the Contract and neatly transfer in red ink, date, and cloud all changes, additions, etc., on these so as to produce one complete set of Drawings indicating all modifications to the original Drawings.

PART 3 EXECUTION

3.1 MAINTENANCE OF JOB SET

A. Immediately upon receipt of the job set described in Paragraph 2.1-A above, identify each of the Documents with the title, "Record Documents - Job Set".

B. Preservation:

1. Considering the Contract completion time, the probable number of occasions upon which the job set must be taken out for new entries and for examination, and the conditions under which these activities will be performed, devise a suitable method for protecting the job set to the approval of the Architect.
2. Do not use the job set for any purpose except entry of new data and for review by the Architect, until start of transfer of data to final Project Record Documents.
3. Maintain the job set at the site of Work as designated by the Architect.

C. Making entries on Drawings:

1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe the change by graphic line and note as required.
2. Date all entries.
3. Call attention to the entry by a "cloud" drawn around the area or areas affected.
4. In the event of overlapping changes, use different colors for the overlapping changes.

D. Make entries in the pertinent other Documents as approved by the Architect.

E. Conversion of schematic layouts:

1. In some cases on the Drawings, arrangements of conduits, circuits, piping, ducts and similar items, are shown schematically and are not intended to portray precise physical layout.
   a. Final physical arrangement is determined by the Contract, subject to the Architect's approval.
   b. However, design of future modifications of the facility may require accurate information as to the final physical layout of items which are shown only schematically on the Drawings.

2. Show on the job set of Record Drawings, by dimension accurate to within one inch, the centerline of each run of items such as are described in subparagraph 3.1-E-1 above.
    a. Clearly identify the item by accurate note such as "cast iron drain", "galv. water" and the like.
    b. Show, by symbol or note, the vertical location of the item ("under slab", "in ceiling plenum", "exposed" and the like).
    c. Make all identification sufficiently descriptive that it may be related reliably to the Specifications.
3. The Architect may waive the requirements for conversion of schematic layouts where, in the Architect's judgment, conversion serves no useful purpose. However, do not rely upon waivers being issued except as specifically issued in writing by the Architect.

3.2 FINAL PROJECT RECORDS DOCUMENTS

A. The purpose of the final Project Record Documents is to provide factual information regarding all aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive site measurement, investigation and examination.

B. Approval of recorded data prior to transfer:

1. Following receipt of the Drawings described in Paragraph 2.1-B above, and prior to start of transfer of recorded data thereto,
2. Make required revisions.

C. Transfer of data to Drawings:

1. Carefully transfer change data shown on the job set of Record Drawings to the corresponding final Record Drawings, coordinating the changes are required.
2. Clearly indicate at each affected detail and other Drawing a full description of changes made during construction and the actual location of items described in Subparagraph 3.1-E-1 above.
3. Call attention to each entry by drawing a "cloud" around the area or areas affected.
4. Make changes neatly, consistently and with the proper media to assure longevity and clear reproduction.

D. Transfer of data to other Documents:

1. If the Documents other than Drawings have been kept clean during progress of the Work, and if entries thereon have been orderly to the approval of the Architect, the job set of those Documents other than Drawings will be accepted as final Record Documents.
2. If any such Document is not so approved by the Architect, secure a new copy of that Document from the Architect at the Architect's usual charge for reproduction and handling, and carefully transfer the change data to the new copy to the approval of the Architect.

E. Review and submittal:

1. Submit the completed set of Contractor's Project Record Documents to the Architect as described in Paragraph 1.3-D above.
2. Participate in review meetings as required.
3. Make required changes and promptly deliver the final Contractor's Project Record Documents to the Architect.
4. Contractor shall sign, indicating approval, of Architect's Project Record Documents.

3.3 CHANGES SUBSEQUENT TO ACCEPTANCE

A. The Contractor has no responsibility for recording changes in the Work subsequent to Final Completion, except for changes resulting from work performed under Warranty.

END OF SECTION

DIVISION 02
EXISTING CONDITIONS

CONTENTS

None in this Project Manual

DIVISION 03
CONCRETE

CONTENTS

None in this Project Manual

DIVISION 04
MASONRY

CONTENTS

None in this Project Manual

DIVISION 05
STEEL

CONTENTS

05 50 00 Metal Fabrications

SECTION 05 50 00

METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following metal fabrications:

1. Rough hardware
2. Steel plates
3. Pipe
4. Cast-in-Place Anchors

1.3 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product data for the following:

1. Paint products.
2. Grout.
3. Hardware.

C. Shop drawings detailing fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other Sections.

D. Welding Certificates: Copies of certificates for welding procedures and personnel.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm experienced in producing metal fabrications 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.

B. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1 “Structural Welding Code - Steel”.
2. AWS D1.2 “Structural Welding Code - Aluminum”.
3. AWS D1.3 “Structural Welding code - Sheet Steel”.

1.5 PROJECT CONDITIONS

A. Field Measurements: Check actual locations of walls and other construction to which metal fabrications must fit by accurate field measurements before fabrication. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.6 COORDINATION

A. Coordinate installation of anchorages for metal fabrications. 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 unit masonry. Deliver such items to project site in time for installation.

PART 2 - PRODUCTS

2.1 FERROUS METALS

A. Metal Surfaces, General: For metal fabrications exposed to view in the completed Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

C. Rolled Steel Floor Plates: ASTM A 786/A 786M.

D. Steel Tubing: Product type (manufacturing method) and as follows:

1. Cold-Formed Steel Tubing: ASTM A 500.

2. Hot-Formed Steel Tubing: ASTM A 501.

a. For exterior installations and where indicated, provide tubing with hot-dip galvanized coating per ASTM A 53.

E. Steel Pipe: ASTM A 53, standard weight (schedule 40), unless otherwise indicated, or another weight required by structural loads.

1. Black finish, unless otherwise indicated.

2. Galvanized finish for exterior installations and where indicated.

F. Cast-in-Place Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials capable of sustaining, without failure, the load imposed within a safety factor of 4, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

G. Welding Rods and Bare Electrodes: Select according to AWS specifications for the metal alloy to be welded.

2.2 PAINT

A. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements of FS TT-P-664, selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.

B. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035 or SSPC-Paint 20.

C. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers.

2.3 FASTENERS

A. General: Provide plated fasteners complying with ASTM B 633, Class Fe/Zn 25 for electrodeposited zinc coating, for exterior use or where built into exterior walls. Select fasteners for the type, grade, and class required.

B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568, Property Class 4.6), with hex nuts, ASTM A 563 (ASTM A 563M), and, where indicated, flat washers.

C. Machine Screws: ANSI B18.6.3.

D. Anchor Bolts: ASTM F1554, Grade 36.

E. Lag Bolts: ANSI B18.2.1 (ANSI B18.2.3.8M).

F. Wood Screws: Flat head, carbon steel, ANSI B18.6.1.

G. Plain Washers: Round, carbon steel, ANSI B18.22.1 (ANSI B18.22M).

H. Lock Washers: Helical, spring type, carbon steel, ANSI B18.21.1.

I. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

1. Material: Carbon steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.

2. Material: Group 1 alloy 304 or 316 stainless-steel bolts and nuts complying with ASTM F 593 (ASTM F 738M) and ASTM F 594 (ASTM F 836M).

J. Toggle Bolts: FS-FF-B-588, tumble wing type, class and style as required.

2.4 GROUT

A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

B. Products: Subject to compliance with requirements, provide one of the following:

1. Nonshrink, Nonmetallic Grouts:

a. Diamond-Crete Grout; Concrete Service Materials Co.
b. Euco N-S Grout; Euclid Chemical Co.
c. Masterflow 928 and 713; Master Builders Technologies, Inc.
d. Sealtight 588 Grout; W. R. Meadows, Inc.
e. Sonogrout 14; Sonneborn Building Products–ChemRex, Inc.

2.5 CONCRETE FILL

A. Concrete Materials and Properties: Comply with requirements of Division 3 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa), unless higher strengths are indicated.

2.6 FABRICATION, GENERAL

A. Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication.

B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.

C. Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints, and overstressing of welds and fasteners. Base design calculations on actual surface temperatures of metals due to both solar heat gain and nighttime sky heat loss.

1. Temperature Change (Range): 100 deg F (55.5 deg C).

D. Shear and punch metals cleanly and accurately. Remove burrs.

E. Ease exposed edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

F. Remove sharp or rough areas on exposed traffic surfaces.

G. Weld corners and seams continuously to comply 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. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing, and contour of welded surface matches those adjacent.

H. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

J. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. 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.

K. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

L. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.

2.7 ROUGH HARDWARE

A. Furnish bent, or otherwise custom-fabricated, bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6 Sections.

B. Fabricate items to sizes, shapes, and dimensions required. Furnish malleable-iron washers for heads and nuts that bear on wood structural connections, and furnish steel washers elsewhere.

2.8 LOOSE BEARING AND LEVELING PLATES

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of the required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required. Galvanize after fabrication. Paint where exposed as per Section 09 90 00.

2.9 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports for applications indicated that are not a part of structural steel framework as required to complete the Work.

B. Fabricate units to sizes, shapes, and profiles indicated and required to receive other adjacent construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitered joints for field connection. Cut, drill, and tap units to receive hardware, hangers, and similar items.

1. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.

a. Except as otherwise indicated, space anchors 24 inches (600 mm) o.c. and provide minimum anchor units in the form of steel straps 1-1/4 inches (32 mm) wide by 1/4 inch (6 mm) thick by 8 inches (200 mm) long.

C. Paint as per Section 09 90 00, where exposed.

2.10 FINISHES, GENERAL

A. Comply with NAAMM "Metal Finishes Manual" for recommendations relative to applying and designing finishes.

B. Finish metal fabrications after assembly.

2.11 STEEL AND IRON FINISHES

A. Preparation for Shop Priming: Prepare uncoated ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:

1. Exteriors (SSPC Zone 1B): SSPC-SP 6 "Commercial Blast Cleaning."

2. Interiors (SSPC Zone 1A): SSPC-SP 3 "Power Tool Cleaning."

B. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes or to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with requirements of SSPC-PA 1 "Paint Application Specification No. 1" for shop painting.

1. Strip paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installing anchorages, including concrete inserts, sleeves, anchor bolts, and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

B. Set sleeves in concrete with tops flush with finish surface elevations. Protect sleeves from water and concrete entry.

3.2 INSTALLATION, GENERAL

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.

D. 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 the surfaces of exterior units that have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.

E. 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 that no roughness shows after finishing, and contour of welded surface matches those adjacent.

3.3 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 requirements for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a 2.0-mil (0.05-mm) minimum dry film thickness.

B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of the shop paint on miscellaneous metal is specified in Division 9 Section "Painting."

END OF SECTION 05 50 00

DIVISION 06
WOOD AND PLASTIC

CONTENTS

06 10 00	Rough Carpentry
06 20 00	Finish Carpentry
06 40 00	Architectural Woodwork
06 60 00	Plastic Fabrications

SECTION 06 10 00

ROUGH CARPENTRY

PART 1 – GENERAL

1.1 SECTON INCLUDES

A. Types of work included in this Section for rough carpentry:
   1. Roof Deck Panels;
   2. Sheathing;
   3. Furring and concealed wood blocking

1.2 RELATED SECTIONS

A. Concrete Formwork – Section 03 10 00.

1.3 SUBMITTALS

A. Affidavit: Submit prior to installation of treated materials, affidavits from treating facility certifying treatment method used, name of treatment material, retention of treatment material (lbs./cu.ft.), and depth of penetration.

B. Product Data: Submit manufacturer's specifications and installation instructions on insulating sheathing.

1.4 STORAGE

A. Store lumber off ground, well ventilated, and covered. Suitable and effective protection from damage shall be provided for finished work and material, and shall remain in place until final clean-up.

PART 2 – PRODUCTS

2.1 LUMBER

A. Standards: Comply with DOC PS20, "American Softwood Lumber Standard" for lumber and with the applicable grading rules of inspection agencies certified by American Lumber Standards committee Board of Review.

B. Identification: Provide lumber with each piece factory marked with grade stamp of inspection agency evidencing compliance with grade stamp of inspection agency and identifying grading agency, grade, species, moisture content at time of surfacing and mill.

C. Moisture Content: Maximum moisture content for lumber products shall be 19 percent on air dried stock.

D. Surfacing: Shall be surface four sides (S4S).

E. Grade: Dimension No. 2 Southern Pine as graded by Southern Pine Inspection Bureau or Douglas Fir standard grade.

F. Preservative Treatment: Lumber specified or indicated to receive preservative treatment shall be treated in accordance with AWPA Standard Specifications. Each piece shall bear quality mark of an inspection agency approved by the American Lumber Standards Committee. Treatment shall be applied after members are shaped. Subsequent to treatment, all saw cuts, borings, etc., shall be saturated with two coats of same preservative used for treatment. Coating shall be applied prior to installation of treated member. At Contractor's option, one of the following methods of treatment shall be used.

Location	Type	Trade Name	Use Category	AWPA Pres. Std.
Above Ground	Fuor-Chrome	Wolman Salts	USC3	P-5
Above Ground	Ammonical Copper-Quat (ACQ)	ACQ Preserve	USC3	P-5
Above Ground	Copper Boron Azole (CBA)	Naturwood	USC3	P-5

2.2 BOARDS

A. Shall be No. 2 Southern Pine as graded by SPIB or Douglas Fir, Construction Boards per WWPA. Refer to allowable stress in General Notes of Structural drawings.

2.3 PERFORMANCE RATED WOOD PANELS

A. General: Conform to DOC PS-1 or PS-2, Exposure 1, structural rating as indicated hereinafter. Each panel shall be identified with grade trademark of American Plywood Association.

B. Roof Sheathing: OSB Sheathing, span rating 48/24, 5/8 inch thick.

C. Exterior Wall Sheathing: OSB Sheathing, span rating 48/24, 1/2 inch thick.

2.4 FASTENERS

A. Provide rough hardware, including nails, screws, bolts, anchors, ties and metal fastenings as required for proper construction and erection of work, or proper type and size suitable for purpose intended and approved by Architect. Where rough carpentry work is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners and anchorages with a hot-dip zinc coating.

PART 3 – EXECUTION

3.1 WORKMANSHIP

A. All work shall be in accordance with best standard practice and shall be under the constant supervision of a competent foreman. Carefully plan and lay out the work as necessary to carry out the intent of the Drawings, and to accommodate other work properly. Wood framing shall be accurately sawcut and fitted, true to line, grade and level, and permanently secured in proper position with nails, lag screws, bolts or other fastenings and fittings. Lumber framing shall be substantial and rigid in all parts and connections.

3.2 WALL SHEATHING INSTALLATION

A. Apply sheathing to exterior studs where indicated, with 1 ½ inch long staples or nails (screws). Fasten three (3) inch o.c. at edges and six (6) inch o.c. on intermediate supports. Abut ends of sheathing at center of supports. Install sheathing with long edge parallel to floor line.

B. Apply asphalt saturated organic felt horizontally with two (2) inch overlap and a six (6) inch end lap. Fasten to sheathing with corrosion-resistant staples. Cut back felt ½ inch on each side of control and expansion joints.

3.3 WALL SHEATHING INSTALLATION AT SHEAR WALLS

A. Fasten to exterior studs with screws at pattern as indicated.

3.4 WOOD PRESERVATIVE TREATMENT

A. Following wood members to receive preservative as specified: wood used in roof construction including fascia backup, cants, nailers. Two brush coats of same wood preservative shall be applied to field cuts.

3.5 BLOCKING INSTALLATION

A. Anchor blocking and nailers using counter-sunk bolts, washers, and nuts. Wedge, align, and anchor blocking and nailers to provide rigid and secure installation of both blocking and other related work. Locate blocking to facilitate installation grilles, registers and fixtures.

3.6 FURRING INSTALLATION

A. Install plumb and level with closure strips at edges and openings. Shim with wood as required for tolerance of finished work. Unless otherwise indicated, provide 1 inch x 2 inch furring at 16 inch o.c. vertically. Provide hangers and attachment devices for suspended furring.

3.7 FASTENING DEVICES

A. Use power-actuated-steel nails, expansion screws, toggle bolts, metal plugs, or metal inserts for installation of rough carpentry members to masonry or concrete construction. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials.

3.8 ROOF SHEATHING

A. Install panels with long dimension perpendicular to supports, with end joints staggered between panels and located over supports. Allow 1/8 inch space between joints. Place fasteners as indicated.

END OF SECTION 06 10 00

SECTION 06 20 00

FINISH CARPENTRY

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: Install wood, nails, screws and other items as needed, and perform finish carpentry for the construction shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01 66 00, Product Storage and Handling Requirements.

PART 2 PRODUCTS

2.1 GRADE STAMPS

A. Identify lumber by the grade stamp of the West Coast Lumber Inspection Bureau, or such other grade stamp as is approved in advance by the Architect.

B. Identify plywood as to species, grade and glue type by the stamp of the American Plywood Association.

2.2 MATERIALS

A. Provide materials in the quantities needed for the Work as indicated on the Drawings and meeting or exceeding the standards of quality specified.

B. Clear wood trim (interior) shall be stain-grade RED OAK, rift sawn.

2.3 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor, subject to approval by the Architect.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.2 WORKMANSHIP

A. Product joints which are true, tight and well nailed with all members assembled in accordance with the Drawings.

B. Jointing:

1. Make joints to conceal shrinkage; miter exterior joints; cope interior joints; miter or scarf end-to-end joints.
2. Install trim in pieces as long as possible, jointing only where solid support is obtained.

C. Fastening:

1. Install items straight, true, level, plumb and firmly anchored in place.
2. Where blocking or backing is required, coordinate as necessary with other trades to ensure placement of required backing and blocking in a timely manner.
3. Nail trim with finish nails of proper dimension to hold the member firmly in place with splitting the wood.
4. Nail exterior trim with galvanized nails, making joints to exclude water and setting in waterproof glue or the sealant described in Section 07 92 00, Joint Sealants, of these Specifications.
5. On exposed work, set nails for putty.
6. Screw, do not drive, wood screws; except that screws may be started by driving and then screwed home.

3.3 INTALLATION OF OTHER ITEMS

A. Install items in strict accordance with the Drawings and the recommended methods of the manufacturer as approved by the Architect, anchoring firmly into position at the prescribed locations, straight, plumb and level.

3.4 FINISHING

A. Sandpaper finished wood surfaces thoroughly as required to produce a uniformly smooth surface, always sanding in the direction of the grain; except do not sand wood which is designed to be left rough.

B. No coarse grain sandpaper mark, hammer mark, or other imperfection will be accepted.

3.5 CLEANING UP

A. Keep the premises in a neat, safe and orderly condition at all times during execution of this portion of the Work, free from accumulation of sawdust, cut-ends and debris.

B. Sweeping:

1. At the end of each working day, and more often if necessary, thoroughly sweep surfaces where refuse from this portion of the Work has settled.
2. Remove the refuse to the area of the job site set aside for its storage.
3. Upon completion of this portion of the Work, thoroughly broom clean all surfaces.

END OF SECTION

SECTION 06 40 00

ARCHITECTURAL WOODWORK

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: Provide Architectural Woodwork where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Codes and Standards:

1. Comply with pertinent codes and regulations of governmental agencies having jurisdiction; and
2. Comply with "Architectural Woodwork Quality Standards" of the Architectural Woodwork Institute for grade or grades specified.
3. WIC Certification and stamp will not be required.

1.3 SUBMITTALS

A. Comply with pertinent provision of Section 01 33 00, Submittal Procedures.

B. Product data: Within 60 calendar days after the Contractor has received the Owner's Notice to proceed, submit:

1. Materials list of items proposed to be provided under this Section;
2. Shop Drawings in sufficient detail to show fabrication, installation, anchorage and interface of the work of this Section with the work of adjacent trades;
3. Samples of proposed materials.

1.4 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01 66 00, Product Storage and Handling Requirements.

PART 2 PRODUCTS

A. Provide architectural woodwork where shown on the Drawings, as specified herein, and as needed for a complete or proper installation.

B. General: Casework shall be constructed of 3/4" plywood or medium density fiberboard (MDF) with plastic laminate on all exposed surfaces and edges (vertical surfaces .030", horizontal surfaces .050"). Semi-exposed surfaces (interior of cabinets) shall be finished with melamine. Color-core plastic laminate at all countertops.

Unexposed surfaces shall be sealed with an acrylic sealer. Construction shall generally comply with A.W.I. flush overlay construction and with the following requirements.

C. Case Bodies: Shall be blind-dadoed or doweled and glued with pressure to receive tops, bottoms and fixed shelves, glued and screwed together to form a rigid unit. Backs shall be screwed attached to perimeter of case. Finished ends and backs to receive plastic laminate after assembly. There shall be no visible screws or other exposed connectors in finished unit. Base boards shall be 3/4" MDF "toe board" and to be covered by rubber base under another section.

D. Doors and Drawers: Doors shall be 3/4" particleboard with stock lumber edges with plastic laminate on both faces and all edges, drawers shall have 1/2" thick hardwood sides or lumber sides, or 1/2" hardwood plywood with edge banding and backs, with continuous dovetail joints, grooved to receive 1/4" tempered hardboard bottom, drawer fronts shall be 3/4" plywood with plastic laminate on both faces and all edges. Alternately, doors and drawer front may have color match vinyl edge banding.

E. Tall Cabinets and Closet Doors: All tall cabinet doors and closet doors to be ¾" particleboard with plastic laminate on the exposed face, all horizontal edges, and vertical edge on hinge side. Provide PVC T-molding equal to Charter Industries #4246 ¾" Flipper door at vertical edge on pull side. Color of T-molding to be selected by Architect. Semi-exposed interior surface to be melamine.

F. Shelves: Shelves to be 1" particleboard finished with melamine.

G. Counter Tops: Shall be 3/4" plywood or MDF with plastic laminate top and edges. Countertops in all sink locations to be ¾" plywood, MDF is not allowed. Laminate backer sheet to bottom. All splashes shall be 3/4" x 4" high, unless otherwise noted. Full height 3/4" splashes are noted on interior elevations. Laminate backer sheet to backs of splash.

H. Adhesive: Plastic laminate shall be laminated to core material with a Type 2, water-resistant adhesive, under pressure.

I. Fillers: Provide filler pieces and strips, trims, etc., for proper fitting of recessed items throughout the job as conditions require, fillers shall be faced with same finish as adjoining casework.

J. Hardware:

1. KV 1428, Accuride 4032, Grass #6036 or equal drawer slides, full extension
2. At upper and lower cabinet doors - Blum 91A6500-195H7100, Salice 300-94, Grass #3703 or approved equal hinges. 110° opening. Two per door.
3. At tall cabinet doors (over 60" tall) – RPC 456, Stanley HT1592-4-2 3/4–US26D or approved equal hinges, three per door.
4. At all cabinets provide Belwith BWPW355-26D, Stanley 4484-US26D, Amerock 979-26D pulls or approved equal. 4" centers.
5. Epco 1000, Amerock, 9783-AL or equal magnetic catch, one per door, two per door if door is over 60" tall
6. Line-bore type shelf standards, 32 mm o.c., four (4) metal shelf rests per shelf.
7. At each computer, telephone, or electrical outlet location underneath countertops provide and install one black, 60 mm dia. cable set as manufactured by Hafele item #429-99-324, Doug Mockett EDP-2 1/2, or equal. Install in work surface top as per direction of Architect.
8. Lever-type, cam lock, black finish, Hafele 235.06.318, East-loc C5511, or equal, at cabinet doors/drawers.
9. Pull-out keyboard shelves: KV 5710 keyboard trays and KV 8150 keyboard slides or Accuride Cbergo-Tray 200.

2.3 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

B. Solid-Surface
   1. Where indicated on the Drawings, provide solid surface synthetic material. Install as per manufacturer's recommendations.
   2. Acceptable manufacturers.
      a. Wilson Art
      b. Formica
      c. Corian

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 FIELD MEASUREMENTS

A. Take necessary measurements in the field to assure proper dimensions for the work of this Section.
B. Prepare Shop Drawing submittal based upon field measurements.

3.3 FABRICATION

A. Fabricate the work of this Section in strict accordance with the approved Shop Drawings and the referenced standards.

3.4 INSTALLATION

A. Install the work of this Section in strict accordance with the approved Shop Drawings and the referenced standards, anchoring all items firmly into position.

B. Cabinets to be installed with chrome plated finish screw and washer in a neat, symmetrical pattern.

C. Install blocking within walls as required to anchor cabinets securely.

END OF SECTION

SECTION 06 60 00

PLASTIC FABRICATIONS

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: Provide laminated plastic where shown on the Drawings, specified herein, and needed for complete and proper installation.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
2. Section 06 40 00, Architectural Woodwork.

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 SUBMITTALS

A. Comply with pertinent provisions of Section 01 33 00, Submittal Procedures for submittals and substitutions.

B. Product data: With 60 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

1. Materials list of items proposed to be provided under this Section.
2. Manufacturer's specifications and other data needed to demonstrate compliance with the specified requirements.
3. Samples of the full range of colors and patterns available in each of the specified grades from the proposed manufacturer.
4. Manufacturer's recommended methods of installation which, when approved by the Architect, will become the basis for acceptance or rejection of actual installation procedures used on the Work.

1.4 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01 66 00, Product Storage and Handling Requirements.

PART 2 PRODUCTS

2.1 LAMINATED PLASTIC

A. Acceptable manufacturers:

1. Wilsonart International, Inc. (800) 433-3222.
2. Nevamar Company, (800) 638-4380.
3. Formica Corporation, (800) 367-6422

B. Colors and patterns: Provide color/finish selected by the Architect from standard colors and finishes of the approved manufacturer.

C. Qualities and types: Provide general purpose type, 0.050" thick on horizontal surfaces, 0.030" on vertical surfaces and 0.020" on cabinet interior, complying with NEMA LD3. Melamine may be substituted in cabinet interior at Contractor's option.

2.2 ADHESIVES

A. For installation of laminated plastic, use only, "rigid set" (urea-resin) or "semi-rigid set" (PVC acetate) adhesives. "Contact" adhesives are allowed for countertops only.

2.3 SOLID SURFACE

A. Fabricators:
   1. Dupont Corian
   2. Formica Surrel
   3. Nevermar Fountainhead
   4. Wilsonart Gibraltor
   5. Substitutions: Section 01 66 00 – Product Requirements

B. Colors and patterns: Provide color/finish selected by the Architect from premium colors and finishes of the approved manufacturer.

C. Qualities and types: Provide general purpose type, ½" thickness.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Install the approved laminated plastic in strict accordance with the manufacturer's recommendations as approved by the Architect.

END OF SECTION

DIVISION 07
THERMAL AND MOISTURE PROTECTION

CONTENTS

07 21 00	Building Insulation
07 27 26	Fluid Applied Membrane Air Barrier
07 42 13.23	Metal Composite Material Wall Panels
07 52 16	SBS Modified Bituminous Membrane Roofing
07 60 00	Flashing and Sheet Metal
07 84 00	Firestopping
07 90 00	Sealants
07 92 00	Joint Sealants

SECTION 07 21 00

BUILDING INSULATION

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: Provide building insulation where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.

B. Upon completion of this portion of the Work, complete and post a certificate of insulation compliance in accordance with pertinent requirements of governmental agencies having jurisdiction.

1.3 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01 64 00.

PART 2 PRODUCTS

2.1 MATERIALS

A. Provide and install the following insulation types where shown on the Drawings, or otherwise needed to achieve the degree of insulation required under pertinent regulations of governmental agencies having jurisdiction.

1. Wall Insulation/Batt: At exterior walls 3-5/8" stud-framed, provide Owens-Corning, EcoTouch Pink or Rockwood Mineral wool, R-15, 3 ½", unfaced batt insulation with flame spread rating of not more than 25, and smoke development of not more than 450, meeting FS-HH-1-521. At all interior stud cavity walls, provide Owens-Corning, EcoTouch, Pink, R-11, 3 ½" unfaced batt insulation with flame spread rating of not more than 25 and smoke development of not more than 450, meeting FS-HH-1-521. Increase thickness to 6" at 6" stud walls and to 8" at 8" stud walls.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

B. Remove, or protect against, projections in construction framing which may damage or prevent proper insulation.

C. Install plastic spacers to insure air flow is continuous, as required by framing condition.

3.2 INSTALLATION

A. Install the work of this Section in strict accordance with the original design, requirements of governmental agencies having jurisdiction, and the manufacturer's recommended installation procedures as approved by the Owner anchoring all components firmly into position.

END OF SECTION

SECTION 07 27 26
FLUID-APPLIED MEMBRANE AIR BARRIERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Air barriers.

1.02 RELATED REQUIREMENTS

A. Section 07 62 00 - Sheet Metal Flashing and Trim: Metal flashings installed in conjunction with air barriers.

B. Section 06 16 00 - Sheathing : Air barrier over exterior sheathing substrate.

1.03 DEFINITIONS

A. Air Barrier: Airtight barrier made of material that is virtually air impermeable but water vapor permeable, both to amount as specified, with sealed seams and sealed joints to adjacent surfaces.

1.04 REFERENCE STANDARDS

A. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension; 2016 (Reapproved 2021).

B. ASTM D751 - Standard Test Methods for Coated Fabrics; 2019.

C. ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds; 1998 (Reapproved 2017).

D. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2021.

E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2025.

F. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.

G. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials; 2021a.

H. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components; 2025.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Provide data on material characteristics, performance criteria, and limitations.

C. Shop Drawings: Provide drawings of special joint conditions.

D. ABAA Field Quality Control Submittals: Submit third-party reports of testing and inspection required by ABAA QAP.

E. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.

F. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.

G. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification; keep copies of each contractor accreditation and installer certification on site during and after installation, and present on-site documentation upon request.

H. Manufacturer's qualification statement.

I. Installer's qualification statement.

J. Testing agency qualification statement.

1.06 QUALITY ASSURANCE

A. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); www.airbarrier.org/#sle:

1. Installer Qualification: Use accredited contractor, certified installers, evaluated materials, and third-party field quality control audit.

B. Air Barrier Association of America (ABAA) Evaluated Air Barrier Assemblies; www.airbarrier.org/#sle: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture, and use secondary materials approved in writing by primary material manufacturer.

C. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

D. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture, and use secondary materials approved in writing by primary material manufacturer.

E. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

1.07 MOCK-UPS

A. Construct an integrated mockup utilizing materials specified in this Section, Section 01 40 00 - Quality Requirements, and as indicated in drawings.

B. Provide completely assembled, typical wall areas installed with related accessories, in composite configurations designed to fulfill the performance criteria, and representative of the design as shown on the drawings.

1. Use specified products and air barrier system approved shop drawing details.
2. Extent of mock-up shall be the same as that which will be provided in the final work.
3. Mock-up shall be installed simulating actual construction conditions, including actual structural supports and connections. Use means, methods and techniques proposed for final installation.
4. Personnel assembling mock-up shall be the same personnel that will perform the actual final units of work at the project site.

C. Provide a mock-up for evaluation of fabrication workmanship.

D. Provide mock-up as detailed in the construction documents, minimum size of 10'-0" x 10' -0" x 10'-0".

E. Locate where directed during the Preliminary Coordination Meeting.

F. Do not proceed with air barrier system work until Architect approves mock-up. Obtain Owner's and Architect's acceptance of finish color, texture and pattern, and workmanship standard.

G. Approval of mock-up does not constitute approval of deviations from the Contract Documents contained in mock-up unless the Architect specifically approves such deviations in writing.

H. Mock-up may not remain as part of work. Maintain during construction for workmanship comparison; remove and legally dispose of materials when directed by Architect.

1.08 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by materials manufacturers before, during, and after installation.

B. Ambient Conditions

1. Do not perform Work during rain or inclement weather.
2. Do not perform Work on surfaces covered in frost, snow, or wet to touch. Damp surfaces are acceptable.
3. Refer to product specific technical data sheet.

1.09 WARRANTY

A. Manufacturer Warranty

1. Provide Air Barrier Manufacturer’s standard 10-year material warranty.

PART 2 PRODUCTS

2.01 AIR BARRIER MATERIALS (AIR IMPERMEABLE AND WATER VAPOR PERMEABLE)

A. Air Barrier, Fluid Applied: Vapor semi-permeable, elastomeric waterproofing.

1. Air Barrier Coating:

a. Substrate conditions: Can be applied to damp surfaces.
b. Rain ready within 30 minutes.
c. Material: Silyl-terminated polyether (STPE).
d. Dry Film Thickness (DFT): 20 mil, 0.020 inch, minimum.
e. Air Permeance: 0.004 cfm/sq ft, maximum, when tested in accordance with ASTM E2178.
f. Water Vapor Permeance: 11 perms, minimum, when tested in accordance with ASTM E96/E96M using Procedure B - Water Method, at 73.4 degrees F.
g. Ultraviolet (UV) and Weathering Resistance: Approved by manufacturer for up to 90 days of weather exposure.
h. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, Class A when tested in accordance with ASTM E84.
i. Comply with NFPA 285 requirements for wall assembly. Vertical and lateral flame propagation: meets IBC NFPA 285 exception number 2
j. Elongation (ASTM D412): 350 percent
k. Nail Sealability: Pass, when tested in accordance with ASTM D1970/D1970M.
l. VOC Content: Zero.
m. Sealants, Tapes and Accessories: As recommended by coating manufacturer.
n. Products:
    1) GCP Applied Technologies; Perm-A-Barrier VPL 50RS UV Stable: www.gcpat.com/#sle.
    2) Henry Company; Air-Bloc All Weather STPE: www.henry.com/#sle.
    3) PROSOCO, Inc; R-GUARD Cat 5: www.prosoco.com/r-guard/#sle.
    4) Soprema; Sopraseal LM 204 VP: www.soprema.us.
    5) Substitutions: See Section 01 60 00 - Product Requirements.

2.02 ACCESSORIES

A. Sealants, Tapes, and Accessories for Sealing Air Barrier and Adjacent Substrates: As indicated or in compliance with air barrier manufacturer's installation instructions, moisture cure, STPE polymer-based.
B. Sealant for Cracks and Joints In Substrates: Resilient elastomeric joint sealant compatible with substrate and air barrier materials.
    1. Application: Apply at 30 to 40 mil, 0.030 to 0.040 inch, nominal thickness.
    2. Elongation: 1,300 percent, measured in accordance with ASTM D412.
    3. Peel Adhesion: 28 lb/inch, minimum, when tested in accordance with ASTM D903.
    4. Hydrostatic Head Pressure: Resists head pressure of 57 feet, maximum, when tested in accordance with ASTM D751.
C. Liquid-applied flashing:
    1. UV-resistant, moisture cure, single-component STPE air barrier.
D. Thru-wall flashing:
    1. Self-adhered, SBS rubberized asphalt thru-wall flashing.
E. Preformed Transition Membrane: Semirigid silicone or polyester composition, tapered edges, tear resistant.
F. Thinners and Cleaners: As recommended by material manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of Conditions

1. Verify the substrate is in accordance with Air Barrier Manufacturer requirements and as specified in this Section prior to air barrier installation. Commencement of the Work indicates installer acceptance of the substrate.
    a. Verify surfaces are sound, clean, and free of frost, oil, grease, dirt, excess mortar or other contaminants.
    b. Verify substrates are continuous and secure, smooth and without large voids, spalled areas, or sharp protrusions.
2. Install sheathing fasteners into solid backing and set flush with sheathing.
    a. Fill grout, strike mortar full, and remove mortar droppings to create a continuous and void free substrate.
    b. Cure for 36 hours
    c. Core fill grout: cure for 48 hours
3. Concrete surfaces:
    a. Fill tie-holes.
    b. Allow concrete to cure for 3 days after removing forms.
    c. Curing compounds: resin based without oil, wax, or pigments.
    d. Substrates must be free of form release agents.

B. Where existing conditions are responsibility of another installer, notify Architect of unsatisfactory conditions.

C. Do not proceed with this work until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

B. Clean and prime substrate surfaces to receive adhesives and sealants in accordance with manufacturer's installation instructions.

C. Protection of In-Place Conditions
1. Protect areas and surfaces not included in scope of Work against damage or soiling.
2. Cap and protect exposed back-up walls against wet weather conditions prior to, during, and after application of air barrier assembly.

3.03 INSTALLATION

A. Install materials in accordance with manufacturer's installation instructions.

B. Air Barriers: Install continuous airtight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
1. Application Rate:
    a. Application rates and wet film thickness as verified with a comb gauge are approximate and may vary depending on texture and porosity of surface.
    b. Wet film thickness (WFT): 20 mils as measured with a comb gauge
    c. Resulting theoretical dry film thickness (DFT): 20 mils

C. Apply sealants and adhesives within recommended temperature range in accordance with manufacturer's installation instructions.

D. Fluid-Applied Coatings or Membranes:
1. Prepare substrate in accordance with manufacturer's installation instructions; treat joints in substrate and between dissimilar materials as indicated.
2. Where exterior masonry veneer is being installed, install masonry anchors before installing air barrier over masonry; provide airtight seal around anchors.
3. Apply bead or trowel coat of mastic sealant with minimum thickness of 1/4 inch along coating seams, rough cuts, and as recommended by manufacturer.
4. Use flashing to seal to adjacent construction and to bridge joints in coating substrate.

E. Openings and Penetrations in Exterior Air Barriers:
   1. It is the responsibility of the post-applied fastening component installer to preserve the integrity of the air barrier.
   2. Supplemental sealant may be required at the point of fastener penetration depending on fastened component profiles, substrate type, and fastener installation workmanship.
   3. Contact the Air Barrier Manufacturer for project specific recommendations.
   4. Install flashing over sills, covering entire sill frame member, extending at least 5 inches onto air barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
   5. At openings with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.
   6. At openings with nonflanged frames, seal air barrier to each side of framing at opening using flashing at least 9 inches wide, and covering entire depth of framing.
   7. At head of openings, install flashing under air barrier extending at least 2 inches beyond face of jambs; seal air barrier to flashing.
   8. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.
   9. Service and Other Penetrations: Form flashing around penetrating item and seal to air barrier surface.

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. Coordination of ABAA Tests and Inspections:
   1. Provide testing and inspection required by ABAA QAP.
   2. Notify ABAA in writing of schedule for air barrier work, and allow adequate time for testing and inspection.
   3. Cooperate with ABAA testing agency.
   4. Allow access to air barrier work areas and staging.
   5. Do not cover air barrier work until tested, inspected, and accepted.

C. Do not cover installed air barriers until required inspections have been completed.

D. Obtain approval of installation procedures from air barrier manufacturer based on a mock-up installed in place, prior to proceeding with remainder of installation.

E. Take digital photographs of each portion of installation prior to covering up air barriers.

3.05 CLEANING

A. Waste Management
   1. As the Work proceeds, and upon completion, promptly clean up and remove from the premises all rubbish and surplus materials resulting from the foregoing Work.
   2. Clean soiled surfaces, spatters, and damage caused by Work of this Section.

3.06 PROTECTION

A. Do not leave materials exposed to weather longer than recommended by manufacturer.

B. Protect air barrier from damage by other trades.

C. Install cladding as soon as practical after application. Refer to product specific technical data sheet for product limitations.

END OF SECTION 07 27 26

SECTION 07 42 13.23
METAL COMPOSITE MATERIAL WALL PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Exterior cladding panel system including the following components:
   1. Aluminum-faced composite panels with mounting system. Panel mounting system including anchorages, furring, fasteners, gaskets, and sealants, related flashing adapters and masking for a complete installation.
   2. Aluminum-faced composite panels to be glazed into curtain wall framing system.
   3. Spandrel back pans behind glazed in aluminum-faced composite panels.
   4. Shop-installed aluminum stiffeners on all panels of 20 square feet or larger.
   5. Parapet coping, column covers, soffits, sills, border, and filler items indicated as integral components of the panel system.
   6. Matching flashing and trim.
   7. System to be fabricated and installed per local code requirements.

1.02 RELATED REQUIREMENTS

A. Section 05 40 00 - Cold-Formed Metal Framing: Panel support framing.
B. Section 06 16 00 - Sheathing: Exterior wall sheathing panels.
C. Section 07 27 009 - Air Barriers: Air and weather-resistive barrier behind wall panel system.
D. Section 07 92 00 - Joint Sealants: Sealing joints between siding and adjacent construction and fixtures.
E. Section 08 43 13 - Aluminum-Framed Storefronts: Storefront components installed with this wall system.
F. Section 08 44 13 - Glazed Aluminum Curtain Walls: Curtain wall components installed with this wall system.

1.03 ABBREVIATIONS, ACRONYMS, AND DEFINITIONS

A. DBVR: Drained and back-ventilated rainscreen system; rainscreen system designed to drain and dry cavity entering water through drainage channels, weeps, and air ventilation.
B. MCM: Cladding material formed by joining two thin metal skins to polyethylene or fire-retardant core and bonded under precise temperature, pressure, and tension.
C. MCM System: Includes MCM sheet material, joints, attachment system components, and miscellaneous materials as appropriate for the design of the project to provide a weather-resistant exterior cladding system.
D. AWB: Assemblies that form an air and weather-resistive barrier system.

1.04 REFERENCE STANDARDS

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2022.
B. ASCE/SEI 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; 2022.
C. AAMA 501.1 - Standard Test Method for Water Penetration of Windows, Curtain Walls and Doors Using Dynamic Pressure; 2017.
D. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2015.
E. AAMA 509 - Voluntary Test and Classification Method for Drained and Back Ventilated Rainscreen Wall Cladding Systems; 2022.
F. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
G. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.
H. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

I. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2025.
J. ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip; 2025a.
K. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
L. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.
M. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2023.
N. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
O. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.
P. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.
Q. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
R. ASTM D1781 - Standard Test Method for Climbing Drum Peel for Adhesives; 1998 (Reapproved 2021).
S. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics; 2023.
T. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates; 2023.
U. ASTM D4145 - Standard Test Method for Coating Flexibility of Prepainted Sheet; 2010 (Reapproved 2022).
V. ASTM D4212 - Standard Test Method for Viscosity by Dip-Type Viscosity Cups; 2023.
W. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films; 2023.
X. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2025.
Y. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
Z. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014 (Reapproved 2021).
AA. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2023).
BB. ASTM E1233/E1233M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Cyclic Air Pressure Differential; 2014 (Reapproved 2021).
CC. ISO 9001 - Quality Management Systems — Requirements; 2015, with Amendment (2024).
DD. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components; 2025.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Preliminary Coordination Meeting: Convene on-site (6) six weeks prior to starting the work of this section to establish a direct line of communication, review initial questions regarding the project, and review project submittal and mock-up requirements
    1. Require attendance by the owner, architect, general contractor's project manager and superintendent, MCM sheet manufacturer's representative, MCM system fabricator and installer, structural sub-framing installer and all relevant sub-contractors including but not limited to AWB, door, storefront, curtain wall, and louver installers.
    2. General contractor to ensure a complete set of contract documents (plans and specifications) are available for review.
    3. Meeting minutes to be furnished by the Architect to all parties within (7) seven business days.

4. Review tentative construction progress schedule and phasing requirements, material availability, truck transportation, parking, anticipated material storage areas, equipment set-up locations, vertical transportation, and personnel.
5. Review all testing and inspection requirements.
6. Review mock-up requirements and site placement.
7. Establish a date for tentative Pre-Installation Meeting.

B. Pre-Installation Meeting: Convene (2) two weeks before starting work of this section to verify project requirements, coordinate with installers of other work, establish condition and completeness of building substrate, review manufacturers' installation instructions and warranty requirements, and to review the mock-up.
1. Require attendance by the owner, architect, general contractor's project manager and superintendent, MCM sheet manufacturer's representative, MCM system fabricator and installer, structural sub-framing installer and all relevant sub-contractors including but not limited to AWB, door, storefront, curtainwall, and louver installers.
2. Review construction progress schedule and phasing requirements.
3. General contractor to ensure reviewed and approved submittals are available for reference.
4. Coordinate shop drawings, construction and installation such that manufacturing can proceed without impact to the general schedule and not be contingent upon field dimensions.
5. Ensure MCM system materials have been delivered and are stored onsite ready for installation.
6. MCM sheet manufacturer’s representative and MCM system manufacturer’s representative to review storage and handling procedures.
7. Review of Mockup:
    a. Examine substrate and AWB conditions.
    b. Examine support conditions for compliance with requirements including alignment between and attachment to structural members.
    c. Review flashings, special details, wall penetrations, openings, and condition of other affecting construction conditions.
    d. If mock-up corrective measures are required, establish a date for re-review onsite by all parties involved prior to starting work of this section.
8. Review installation procedures and establish procedures to maintain optimum working conditions and coordinate this work with related and adjacent work including but not limited to the following:
    a. Coordinate building framing in relation to MCM rainscreen assembly.
    b. Coordinate window, door and louver, and other openings and penetrations of MCM rainscreen assembly.
    c. Coordinate MCM rainscreen assembly with rain drainage work, flashing, trim, and construction of other adjoining work to provide a leak proof, and secure installation.
    d. Review procedures for protection of work and adjacent construction both during and after installation.
    e. Review procedures for repair and replacement of panels damaged after installation.
    f. Review safety precautions.
    g. Architect to furnish meeting minutes containing proceedings including corrective measures and actions required, and furnish a copy of record to all parties within (7) seven business days.

1.06 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data - MCM Sheets: Manufacturer's data sheets on each product to be used, including thickness, physical characteristics, and finish, and:
1. Finish manufacturer's data sheet showing physical and performance characteristics.
2. Storage and handling requirements and recommendations.

3. Fabrication instructions and recommendations.
4. Specimen warranty for finish, as specified herein.

C. Product Data - MCM System: Fabricator and Manufacturer's data sheets on each product to be used, including:
1. Physical characteristics of components shown on shop drawings.
2. Storage and handling requirements and recommendations.
3. Installation instructions and recommendations.
4. Specimen warranty for wall system, as specified herein.

D. Shop Drawings: Show layout and elevations, dimensions and thickness of panels, connections, details and location of joints, sealants and gaskets, method of anchorage, support clips, number of anchors, supports, reinforcement, trim, flashings, and accessories.
1. Indicate panel numbering system.
2. Differentiate between shop and field fabrication.
3. Indicate substrates and adjacent work with which the wall system must be coordinated.
4. Include large-scale details showing thicknesses and dimensions of the system parts, details of edge conditions, attachment system, corners, closures, fastening and anchorage methods, locations of joints, location and configuration of joints neccessary to accommodate thermal movement, and all trim, flashing, and accessories.
5. Include large-scale details and/or schematic, exploded or isometric diagrams to fully explain flashing, drainage system, and rainscreen interface at a scale of not less than 1-1/2 inches per 12 inches.
6. Provide signed and sealed drawings by a qualified Structural Engineer licensed in the project jurisdiction, of the MCM system showing conformance with the performance requirements and design criteria identified for this project.

E. Fabrication Tickets: Submit fabrication drawings showing location and types of alluminum-extruded stiffeners at typical panels and at corner panels, where required.

F. Verification Samples:
1. MCM System assembly: 12 inch x 12 inch MCM System sample in thickness specified, including clips, anchors, supports, fasteners, closures, and other panel accessories. Panel sample need not be provided in specified color(s).
2. For each finish product specified, submit at least three samples, minimum size 12 inch square, and representing actual product in color and texture.

G. Delegated Design Data: Submit MCM system fabricator's complete system design and engineering analysis/calculations including, but not limited to:
1. Show governing MCM types, mounting system including anchorages, connections, and fasteners. Indicate location, type magnitude, and direction of loads imposed on the building structural frame.
2. Analysis/Calculations shall be signed and sealed by a qualified Structural Engineer licensed in the project jurisdiction showing that the MCM system is in conformance with the performance requirements and design criteria identified for this project, for Architect's information and project record.

H. Test Reports: For each product type specified, test performed by a qualified testing agency.
1. MCM Sheet Manufacturer's Material Test Reports: Certified test reports showing compliance with specific performance or a third-party listing documenting compliance to comparable cide sections IBC 1407.14 and IBC 1703.5.
2. MCM System Fabricator's Certified System Test Reports: Certified system test reports showing system compliance with specific performance or a third-party listing documenting compliance code section. Base performance requirements on MCM system type provided:
a. DBVR System: Tested to AAMA 509.

I. Certificates: Submit product certificates signed by MCM Sheet Manufacturer certifying that MCM sheets comply with specified performance characteristics and physical requirements indicated in this specification.

J. Test Report: Submit test report verifying compliance with NFPA 285 for previously-tested exterior wall assembly.
K. Manufacturer's Field Quality-Control Reports: Provide within 48 hours of field review. State what was observed and what changes, if any, were requested or required.
L. Delegated Design Structural Engineer's qualification statement.
M. MCM Manufacturer's qualification statement and certifications.
N. MCM System Fabricator's qualification statement and certifications.
O. MCM System Installer's qualification statement and certifications.
P. Closeout Submittals:
    1. Executed Warranty: MCM Manufacturer, Fabricator, and Installer warranty documents as specified within the Warranty section of this specification. Ensure that forms have been completed in Owner's name and registered with manufacturer.
    2. Maintenance Data: Care of finishes and warranty requirements.
    3. "As-Built Shop Drawings" indicating field measurements utilized during fabrication process.

1.07 QUALITY ASSURANCE

A. Delegated Design Structural Engineer's Qualifications: Design structural supports, attachment, and anchorages by, or under direct supervision of, a Structural Engineer experienced in design of this type of work and licensed in State.
B. Single Source Requirements:
    1. It is recommended, but not required, that fabrication and installation of MCM system shall be from a single source. If not single source, both MCM System fabricator and the installer must show proof of past successful collaboration.
    2. MCM System fabricator and installer shall assume undivided responsibility for all components of the MCM system, including but not limited to, attachment to sub-framing components, attachment to primary framing system, panel-to-panel joinery, panel-to-dissimilar-material joinery, and joint seals associated with the MCM system.
C. MCM Manufacturer Qualifications: Company specializing in manufacturing wall panel systems specified in this section.
    1. Certified in accordance with with ISO 9001.
    2. With not less than five years of documented continuous experience manufacturing MCM of the types specified in North America.
    3. Able to produce the composite material without outsourcing of the coating or laminating process.
    4. Able to provide specified warranty on sheet and finish.
    5. Provide a list of five other projects similar in size, including approximate date of installation and name of Architect for each.
D. MCM System Fabricator Qualifications: The MCM System Fabricator of this project's MCM System must be:
    1. A Certified MCM Fabricator by the Metal Construction Association (MCA) or
    2. Meet the Fabricator Requirements shown in this section and provide supporting documentation.
        a. Fabricator Requirements:
            1) The MCM System Fabricator shall demonstrate and offer written attested certification by at least (1) one specified MCM Manufacturer that they have fabricated a minimum of 150,000 square feet of architectural walls per year, that are used as the building weathering envelope, utilizing MCM of at least 4mm thickness.
            2) System components shall be shop fabricated.
            3) Fabrication of other types of panels or fabricator's goods is not considered as meeting the above requirement.
            4) MCM System Fabricator shall provide field service representation during construction.

3. Submit contact names and phone numbers for at least three references connected with successful past projects.

E. MCM Installer Qualifications: Company specializing in performing work of type specified in this section.
   1. The MCM System Installer shall have been in business under the present name for at least five years prior to the start of this project and have experience with similar sized MCM system projects.
   2. The MCM System Installer must be an approved installer by a MCA Certified Fabricator for the installation of their MCM System and employ installers and supervisors who have undergone proper training for the specified system thereof.
   3. The MCM System Installer must be capable of providing field representation during construction.
   4. Submit contact names and phone numbers for at least three references connected with successful past projects.

F. Fabrication Schedule: Coordinate fabrication schedule with general contractors construction progress schedule to avoid delays in work.

G. Testing Agency Qualifications: Independent agency experienced in testing assemblies of the type required for this project and having the necessary facilities for full-size mock-up testing of the type specified.

1.08 MOCK-UPS

A. Construct an integrated mockup utilizing materials specified in this Section, Section 01 40 00 - Quality Requirements, and as indicated in drawings.

B. Provide completely assembled, typical wall areas installed with related accessories, in composite configurations designed to fulfill the performance criteria, and representative of the design as shown on the drawings.
   1. Use specified products and MCM System Fabricator approved shop drawing details.
   2. Extent of mock-up shall be the same as that which will be provided in the final work.
   3. Mock-up shall be installed simulating actual construction conditions, including actual structural supports and connections. Use means, methods and techniques proposed for final installation.
   4. Personnel assembling mock-up shall be the same personnel that will perform the actual final units of work at the project site.

C. Provide a mock-up for evaluation of fabrication workmanship.

D. Provide mock-up as detailed in the construction documents, minimum size of 10'-0" x 10' -0" x 10'-0".

E. Locate where directed during the Preliminary Coordination Meeting.

F. Provide specified finish on panels.

G. Do not proceed with wall panel system work until Architect approves mock-up. Obtain Owner's and Architect's acceptance of finish color, texture and pattern, and workmanship standard.

H. Approval of mock-up does not constitute approval of deviations from the Contract Documents contained in mock-up unless the Architect specifically approves such deviations in writing.

I. Mock-up may not remain as part of work. Maintain during construction for workmanship comparison; remove and legally dispose of materials when directed by Architect.

1.09 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 74 19 - Construction Waste Management and Disposal for packaging waste requirements.

B. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

C. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
   1. Protect finishes by applying heavy-duty removable plastic film during production. Retain strippable protective covering on MCM system panels during installation.
   2. Package for protection against transportation damage.
   3. Provide markings to identify components consistently with drawings.

4. Exercise care in unloading, storing, and installing panels to prevent bending, warping, twisting, and surface damage.

D. Unload and store products protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
   1. Unload and store MCM system panels in a manner to prevent bending, warping, twisting and surface damage. Stack MCM system panels on platforms or pallets.
   2. Store in well-ventilated space out of direct sunlight.
   3. Protect from moisture and condensation with tarpaulins or other suitable weathertight covering installed to provide ventilation.
   4. Store at a slope to ensure dryness, with positive drainage of accumulated water.
   5. Do not store in enclosed space where ambient temperature can exceed 120 degrees F or manufacturer's recommendations if more stringent.
   6. Avoid contact with other materials that might cause staining, denting, or other surface damage.

1.10 FIELD CONDITIONS

A. Do not install panels when air temperature or relative humidity are outside manufacturer's limits.

B. Proceed with installation only when existing and forecast weather conditions permit assembly of MCM system panels in accordance with manufacturer's written instructions and warranty requirements.

1.11 PROJECT CONDITIONS

A. Substrate Tolerances: The general contractor is responsible for providing a substrate with a tolerance of 1/4" in 20.0 feet, on level, plumb, and location control lines as indicated and within 1/8" offset of adjoining faces of alignment of matching profiles tolerances are noncumulative.

B. Field Measurements: Verify locations of wall framing members and wall opening dimensions by field measurements prior to the fabrication of the MCM System. Indicate measurements on the "As-Built Shop Drawings". Field measurements to be taken once all substrate materials and adjacent materials are installed.

C. Project Schedule: Provisions in the project schedule must be made by the general contractor to accommodate the time interval between field measurements and fabrication/installation.

1.12 WARRANTY

A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.

B. MCM Manufacturer's Material Warranty: Submit, to the Owner, the manufacturer's standard warranty document executed by authorized company official.
   1. Warranty Period:
      a. MCM Material Integrity: (5) Five plus (1) one years from date of shipment.
      b. MCM Painted Finish: (20) Twenty plus (1) one years from date of shipment.
         1) MCM Manufacturer will repair or replace MCM panels that show evidence of deterioration, fading, flaking, chalking, or delamination of factory-applied finishes.

C. MCM System and System Installation Warranty: Submit, to the Owner, the MCM Fabricator System's standard warranty document executed by authorized company official. The MCM System's assembly warranty is in addition to and not a limitation of, other rights Owner may have under the Contract Documents.
   1. Warranty Period:
      a. MCM System Workmanship: (1) One year warranty period commencing on the Date of Substantial Completion.
      b. Special Warranty: The MCM System Fabricator will repair or replace components of the MCM System that fails in materials or workmanship within the specified (1) one year warranty period above.
         1) Failures include: deterioration of metals and other materials beyond normal weathering; structural failures including rupturing, cracking, puncturing, or loss of bond/adhesion characteristics.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Composite Material (MCM) Manufacturers:
   1. 3A Composites USA, ALUCOBOND; ALUCOBOND PLUS: www.alucobondusa.com.
   2. Alfrex, LLC; Alfrex fr: www.alfrexusa.com/#sle.
   3. Mitsubishi Chemical America, Inc., ALPOLIC Division; ALPOLIC/fr (Fire Retardant core): www.alpolic-americas.com.
   4. Arconic Architectural Products, LLC; Reynobond FR Aluminum Composite Materials: www.arconic.com/web/aap-northamerica.

B. MCM System Fabricators:
   1. Abrams Architectural Products, Inc.; AAP-100 4mm Rainscreen: www.abramssales.com
   2. Americlad, LLC; AC-1200BV Dry Set Aluminum Composite Panel System (Back Ventilated Rainscreen Dry Joint): www.americlad.com
   3. DAMS Incorporated; CCRS Series: www.damsinc.com.
   4. The Miller-Clapperton Partnership, Inc.; System 1500: www.millerclapperton.com
   5. Petersen Aluminum Corporation; PAC-3000 RS: www.pac-clad.com.

2.02 MCM SYSTEM (DBVR TYPE)

A. MCM System: Factory-formed and factory-assembled MCM panels, fasteners, sub-framing, and anchors designed to be supported by primary structural framing, or other substrate, and glazed into curtain wall assemblies specified in other sections; provide installed panel system capable of maintaining specified performance without defects, damage, or failure.
   1. Provide structural design by or under direct supervision of a Structural Engineer licensed in State.
   2. System must provide an open joint design with allowance for adequate ventilation while preventing excessive water infiltration to contact the AWB.The AWB must be installed and compliant to related sections. All drained and back ventilated rainscreen systems (DBVR) must have undergone the voluntary test and classification of AAMA 509.
   3. Anchor panels to supporting framing without exposed fasteners.

2.03 PERFORMANCE REQUIREMENTS

A. Structural: Provide MCM system that has been manufactured, fabricated, and installed to withstand the following loads based on compliance with ASTM E330 test standards, applicable local building code, and any other listed loads in the structural drawings, to maintain performance criteria stated by manufacturer without defects, damage, or failure.
   1. Wind Load:
      a. As indicated in structural drawings and per local code requirements, but in no case less than 30.0 psf. Do not reduce wind pressures based on tributary area, directionality, or any other consideration.
      b. Normal to the plane of the wall between supports, deflection of the secured perimeter-framing members shall not exceed L/175 or 3/4", whichever is less.
      c. Normal to the plan of the wall, the maximum panel deflection shall not exceed L/60 of the full span.
      d. Maximum anchor deflection shall not exceed 1/16" in any direction. At 150% design pressure, permanent deflections of framing members shall not exceed L/1000 of span length and components shall not experience failure of gross permanent distortion. At connection points of framing members to anchors, permanent set shall not exceed 1/16".
   2. Thermal Movement:
      a. Provide for free and noiseless vertical and horizontal thermal movement due to expansion and contraction under material temperature range of (minus) -20 degrees F to 180 degrees F without

buckling, opening of joints, undue stress on fasteners, or other detrimental effects; allow for ambient temperature at time of fabrication, assembly, and erection procedures.

B. Air Leakage: 0.06 cfm/sq ft maximum leakage when tested at 1.57 psf pressure difference in accordance with AAMA 509; ASTM E283/E283M.

C. Water Penetration: No water penetration under static pressure when tested in accordance with AAMA 509; ASTM E331 and AAMA 501.01 at a differential of 10 percent of inward acting design load, 6.24 psf minimum, after 15 minutes exposure.
   1. Water penetration is defined as the appearance of uncontrolled water on the interior face of the wall through the exterior face of the assembly.
   2. MCM System shall be designed to drain water leakage and condensation occurring at the joints to the exterior face of the wall.
   3. Provide internal gutters and weep system to collect and drain water to the exterior. Coordinate gutter and weep system with other sections.

D. The MCM system shall have an AAMA 509 classification where the V-axis classification number is greater than or equal to the W-axis classification number as presented on the AAMA 509 Chart 1a or 1b. (i.e. V2/W2 is acceptable, V1/W2 is not acceptable)

E. Fire Performance: Provide MCM system with fire-retardant core. Wall assemblies containing MCM System shall meet the requirements of the Intermediate Scale Multi-story test, NFPA 285.

2.04 MCM PANELS

A. MCM Panels: 1 inch deep pans formed of 0.157 inch (4mm) thick metal composite material sheet by routing back edges of sheet, removing corners, and folding edges.
   1. Reinforce corners with riveted aluminum angles.
   2. Provide concealed attachment to supporting structure by adhering attachment members to back of panel; attachment members may also function as stiffeners.
   3. System must not have any visible telegraphing on the panel faces or any other compromise of a neat and flat appearance.
   4. Reinforce all panels 20 SF or larger with shop-installed aluminum stiffeners. Minimum stiffener spacing is one per 20 square feet of panel area.
   5. Secure members to back face of panels using structural silicone sealant approved by MCM sheet manufacturer.
   6. Fabricate panels under controlled shop conditions. Assume design temperature of 70 degrees F and allow for ambient temperature range at the time of fabrication.
   7. Fabricate panels to avoid compressive skin stresses. The installation detailing shall be such that panels remain flat regardless of temperature changes and at all times remain airtight and watertight.
   8. Make allowance for field adjustments and thermal movement without requiring field fabrication of panels.
   9. Fabricate panels to dimensions as indicated on drawings and as recommended by MCM sheet manufacturer.
      a. Make panel lines, breaks, curves, and angles sharp and true.
      b. Keep plane surfaces free from warp or buckle.
      c. Fabricate panels with sharply cut edges and no displacement of face sheet or protrusion of core.
      d. Keep panel surfaces free of scratches or marks caused during fabrication.
   10. Tolerances:
      a. Thickness (4mm Panels): +/- 0.008 inch (+/-) 0.2mm
      b. Width: +/- 0.079 inch (+/-) 2mm @ 70 degrees F
      c. Length: +/- 0.012 inch (+/-) 0.3mm @ 70 degrees F
      d. Squareness:+/- 0.079 inch (+/-) 2mm @ 70 degrees F
      e. Bow: Panels shall be visually flat and display maximum 0.5% length or width.

11. Provide joint details providing a watertight and structurally sound wall panel system that allows no uncontrolled water penetration on inside face of panel system.
12. For "dry" jointing, secure extrusions to returned pan edges with stainless steel rivets; provide means of concealed drainage with baffles and weeps for water that might accumulate in members of system.

2.05 MATERIALS

A. Metal Composite Material (MCM) Sheet: Two sheets of aluminum sandwiching a solid fire-retardant core of extruded thermoplastic material formed in a continuous process with no glues or liquid adhesives between dissimilar materials. The core materials hall be free of voids and/or air spaces and not contain foamed insulation material content. Products are laminated sheet by sheet in a batch process using glues or adhesives between materials shall not be acceptable. The core and the skins shall be thermally bonded in a continuous process under heat, pressure, and tension.
   1. Overall Sheet Thickness: 0.157 inch.
   2. Face Sheet Thickness: .020 inch, minimum.
   3. Fire-retardant core material must be in accordance with specific provisions of IBC Section 1407.10.
   4. Aluminum Alloy: Manufacturer's standard series, selected for best appearance and finish durability.
   5. Bond and Peel Strength: No adhesive failure of the bond between the core and the skin nor cohesive failure of the core itself below 22.5 inch-pound/inch with no degradation in bond performance, when tested in accordance with ASTM D1781, simulating resistance to panel delamination, after 8 hours of submersion in boiling water at 212 degrees F and after 21 days of immersion in water at 70 degrees F.
   6. Surface Burning Characteristics: Class A flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84 in the maximum thickness intended for use.
   7. Flammability: Self-ignition temperature of 650 degrees F or greater when tested in accordance with ASTM D1929.

B. Metal Framing Members: Include sub-girts, zee-clips, base and sill angles and channels, hat-shaped and rigid channels, and furring channels required for complete installation.
   1. Provide material strength, dimensions, configuration as required to meet applied loads and in compliance with applicable building code.
   2. Sheet Steel Components: ASTM A653/A653M galvanized to G90/Z275 or zinc-iron alloy-coated to A60/ZF180; or ASTM A792/A792M aluminum-zinc coated to AZ60/AZM180.
   3. Aluminum Components: ASTM B209/B209M; or ASTM B221 (ASTM B221M).

C. Attachment System Components
   1. Formed from extruded aluminum as indicated on Contract Drawings to meet the specified design loads and system test performance according to each MCM System Fabricator's design.
   2. Galvanized cold-formed steel clips or staggered aluminum angles are not acceptable for panel-to-panel attachment.
   3. Panel stiffeners, as required, shall be positively engaged in the perimeter extrusion, or mechanically fastened to the perimeter extrusion, and shall be secured to the rear face of the composite panel with silicone or high-strength double-sided bonding tape of sufficient size and strength to maintain panel's specified deflection under load. Structural calculations shall be provided to show the adequacy of this connection to resist the applied loads.
   4. Galvanized steel and MCM are not to be used as stiffener elements. Only panel stiffeners composed of extruded aluminum or 300 series stainless steel shapes shall be acceptable.

2.06 FINISHES

A. Fluoropolymer Coil Coating System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, with at least 80 percent of coil coated metal surfaces having minimum total dry film thickness (DFT) of 1.20 mils.

1. Coating shall be factory-applied on a continuous-process paint line. Prepare, pretreat, prime, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.
2. Resin: Provide PVDF coating system containing Kynar 500 or Hylar 5000 resins.
3. Exterior Exposure: 10 years at 45 degrees, South Florida. ASTM D2244 shall be max. 5 fade and ASTM D4214 shall be max. 8 chalk.

B. Color/Texture/Gloss: As selected by Architect from manufacturer's standard 2-coat range.
1. MCM Panel: (MP-01) Field color

2.07 ACCESSORIES

A. Provide components required for a complete, weathertight panel system including but not limited to; trim, copings, fasciae, mullions, sills, corner nits, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish with the same finish system as the MCM panels unless otherwise noted.

B. Flashing: Sheet aluminum; 0.040 inch thick, minimum; finish and color to match MCM sheet; see Section 07 62 00 for additional requirements.
1. Provided by panel manufacturer to match the adjacent curtain wall / MCM panel system finished where exposed. Post-painted spray-applied flashings are not acceptable. Provide a lap strap under the flashing at abutted conditions and seal lapped surfaces with a full bead of non-hardening sealant.

C. Support for Cladding and Continuous Insulation: Continuous thermal Z-girts.
1. Thermally isolated girts with attachment holes that provide cladding support for metal wall panels installed over exterior insulation, designed to prevent accumulation of liquid water on upper edge and maintain visual design intent.
   a. Thickness: 16 gage minimum.
   b. Depth: As required for thickness of insulation.
   c. Length: 96 inches.
   d. Spacing: 16 inches on center, vertically.
   e. Web Perforations: Minimum 50 percent open area.
   f. Thermal isolation located between back flange and substrate; continuous along length of channel.
   g. Thermal Isolation Thickness: 0.25 inches minimum.
   h. Conductivity: Less than 0.18 Watts per Meter Kelvin
   i. Fasteners: As recommended by clip manufacturer, to positively enagage building primary framing system.
   j. Finish: Mill.

D. Anchors, Clips, and Accessories: Use one of the following:
1. Stainless steel complying with ASTM A276/A276M, ASTM A480/A480M, or ASTM A666/A666M.
2. Steel complying with ASTM A36/A36M and hot-dip zinc coating to ASTM A153/A153M.
3. Steel complying with ASTM A36/A36M and hot-dip galvanized to ASTM A123/A123M, with Coating Thickness Grade of 100.

E. Joint Sealer: Provide color to match wall panels silicone sealant of type approved by MCM sheet manufacturer, and in compliance with ASTM C920.

PART 3 EXECUTION

3.01 MCM FABRICATOR/INSTALLER INSTRUCTIONS

A. Compliance: Comply with Manufacturer's product data, including product technical bulletins and product packaging instructions.

3.02 EXAMINATION

A. Examine dimensions, tolerances, and interfaces with other work

1. Verify that air and weather-resistant barrier system is properly installed; see Section 07 27 00 for requirements.

B. Examine substrate on-site to determine that conditions are acceptable for product installation in accordance with manufacturer's written instructions.

C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

D. Notify Architect in writing of conditions detrimental to proper and timely completion of work, and do not proceed with erection until unsatisfactory conditions have been corrected.

3.03 PREPARATION

A. Protect adjacent work areas and finish surfaces from damage during installation.

B. Install miscellaneous MCM system support members and anchorage according to MCM System written instructions and drawings supplied by the MCM System Fabricator.

C. Field measurements of the site conditions are to be taken prior to beginning fabrication work and notification of any material modifications and resulting schedule adjustments shall be formally documented. Indicate measurements on the "As-Built Shop Drawings".

3.04 INSTALLATION

A. Do not install products that are defective, including warped, bowed, dented, and broken members, and members with damaged finishes.

B. Comply with instructions and recommendations of MCM Manufacturer and MCM System Fabricator, as well as with approved shop drawings.

C. Install wall system securely allowing for necessary thermal and structural movement; comply with wall system manufacturer's instructions for installation of concealed fasteners.

D. Install MCM system wall panels to allow individual panels to "free float" and be installed and removed without disturbing adjacent panels.

E. Install anchorage and fasteners in predrilled holes.

F. Do not handle or tool products during erection in manner that damages finish, decreases strength, or results in visual imperfection or failure in performance. Return component parts that require alteration to shop for refabrication, if possible, or for replacement with new parts.

G. Do not form panels in field unless required by wall system manufacturer and approved by the Architect; comply with MCM sheet manufacturer's instructions and recommendations for field forming.

H. Separate dissimilar metals; use gasket fasteners, isolation shims, or isolation tape where needed to eliminate possibility of electrolytic action between metals.

I. Install flashings and sealants as indicated on shop drawings and at all openings whether indicated or not. At flashing butt joints, provide a lap strap under flashing and seal lapped surfaces with a full bed of non-hardening sealant.

J. Install square, plumb, straight, and true, accurately fitted, with tight joints and intersections, shimmed as recommended by MCM System Fabricator, maintaining the following installation tolerances:

1. Variation From Plane or Location: 1/2 inch in 30 feet of length and up to 3/4 inch in 300 feet, maximum.
2. Deviation of Vertical Member From True Line: 0.25 inch in 20 feet run, noncumulative.
3. Deviation of Horizontal Member From True Line: 0.25 inch in 20 feet run, noncumulative.
4. Offset From True Alignment Between Two Adjacent Members Abutting End To End, In Line: 0.03 inch, maximum.

K. Provide weathertight escutcheons for pipe and conduit penetrating MCM panels.

3.05 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for additional requirements.

B. MCM Manufacturer's Field Services: Provide field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with instructions.

C. MCM System Fabricator's Field Services: Engage a factory-authorized service representative to inspect MCM System installation, including accessories.

D. MCM panels will be considered defective if they do not pass the inspections.

E. Additional inspections shall be at the General Contractor's expense and are to be performed to determine compliance of replaced or additional work with specified requirements.

F. Site Visits: Schedule two site visits during execution of installation, and one final visit after completion.

G. MCM Manufacturer and MCM System Fabricator representatives to prepare and distribute inspection reports to the General Contractor and the Architect.

3.06 ADJUSTING

A. Remove and replace panels damaged beyond repair as a direct result of the panel installation.

B. Repaired components of the MCM System with minor damage must not be discernible at a distance of 10 feet from the surface at a 90 degree angle per AAMA 2605.

3.07 CLEANING

A. See Section 01 70 00 - Execution and Closeout Requirements for additional requirements.

B. Ensure weep holes and drainage channels are unobstructed and free of dirt and sealants.

C. Remove protective strippable film after installation of joint sealers, after cleaning of adjacent materials, and immediately prior to completion of work unless otherwise indicated in manufacturer's written installation instructions.

D. Remove temporary coverings and protection of adjacent work areas.

E. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance.

F. Remove from the project site all damaged MCM panels, protective film, and other debris attributable to work of this section and legally dispose.

3.08 PROTECTION

A. Protect installed panel system from damage until Date of Substantial Completion.

END OF SECTION 07 42 13.23

SECTION 07 52 16

STYRENE-BUTADIENE-STYRENE (SBS) MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. SBS-modified bituminous membrane roofing – only as required to patch existing roof where new penetrations are made and new roof access hatch is installed.

B. Cover board.

C. Roof insulation.

D. Roof accessories.

1.2 RELATED SECTIONS

A. Division 06 Section "Rough Carpentry" for wood nailers, cants, curbs, and blocking.

B. Division 07 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counter-flashings.

1.3 REFERENCES

A. Roofing Terminology: Refer to the following publications for definitions of roofing work related terms used in this Section:

1. ASTM D 1079 “Terminology Relating to Roofing and Waterproofing.”
2. Glossary of NRCA's "The NRCA Roofing Manual."
3. Roof Consultants Institute “Glossary of Roofing Terms.”

B. Sheet Metal Terminology and Techniques: SMACNA “Architectural Sheet Metal Manual.”

C. Cold Adhesive or Torch applied membrane flashing.

1.4 DESIGN CRITERIA

A. General: Installed roofing membrane system shall remain watertight; and resist specified wind uplift pressures, thermally induced movement, and exposure to weather without failure.

B. Material Compatibility: Roofing materials shall be compatible with one another under conditions of service and application required, as demonstrated by roofing system manufacturer based on testing and field experience.

C. Wind Uplift Performance: Roofing system shall be identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist wind uplift pressure calculated in accordance with ASCE 7-10, Occupancy Category III, Exposure B, and meeting applicable FM I-90, I-150, or I-225 Windstorm Classifications, min. as required for location on roof: field, perimeter, or corner, with wind uplift capacities of 45, 75, 112 psf respectively. The roof perimeter dimension is indicated on the Drawings. Roofing Manufacturer shall submit testing data showing their system meets wind uplift performance requirements.

D. Securement of all roof associated components shall follow recommendations of FM 1-29, "Roof Deck Securement and Above-Deck Roof Components" and FM 1-49, "Perimeter Flashing."

E. State of Louisiana-Approved Equal Roofing Products

1. **Certainteed Commercial Roofing**

   a. **Field Plies:**
      1) **Cap Sheet:** Flintlastic FR-P Cap Sheet (168 mils; weight 100 lbs. per one square roll; with a polyester mat)
      2) **Interply:** Flintlastic Ultra Poly SMS Base Sheet (148 mils; weight 89 lbs. per one square roll; with a polyester mat)

   b. **Mopped Granular Flashing Plies:**
      1) **Cap Ply:** Flintlastic FR-P Cap Sheet (168 mils; weight 100 lbs. per one square roll; with a polyester mat)
      2) **Stripping Ply:** Flintlastic Ultra Poly SMS Base Sheet (148 mils; weight 89 lbs. per one square roll; with a polyester mat)

   c. **Heat Fused Granular Flashing Plies:**
      1) **Cap Ply:** Flintlastic GTS-FR (160 mils; weight 103 lbs. per one square roll; with a polyester mat)
      2) **Stripping Ply:** Flintlastic Ultra Poly SMS Base Sheet (148 mils; weight 89 lbs. per one square roll; with a polyester mat)

   d. **Heat Fused Aluminum Clad flashing Plies:**
      N/A

   e. **Cold Adhesive:** Flintbond SBS Modified Bitumen Adhesive, Brush Grade

2. **Firestone Building Products Company**

   a. **Field Plies:**
      1) **Cap Sheet:** Firestone SBS FR (115 mils/2.92 mm thick measured at the selvedge edge; weight 91 lbs. per square; with glass yarn/polyester mat).
      2) **Interply**: Firestone SBS Smooth (140 mils/3.6 mm thick; weight 90 lbs per one square roll; with glass yarn/polyester mat).

   b. **Mopped Granular Flashing Plies:**
      1) **Cap Ply:** Firestone SBS FR Cap (148 mils/3.8 mm thick; weight 97 lbs. per square; with glass yarn/polyester mat).
      2) **Stripping Ply**: Firestone SBS Smooth (140 mils/3.6 mm thick; weight 90 lbs. per one square roll; with glass yarn/polyester mat).

c. **Heat Fused Granular Flashing Plies:**
   1) **Cap Ply**: Firestone SBS Torch (150 mils/3.8 mm thick; weight 95 lbs. per one square roll; with non-woven polyester mat with continuous glass fiber yarn).
   2) **Stripping Ply**: Firestone SBS Ply Torch Base (120 mils/3.0 mm thick; weight 85 lbs. per one square roll; with non-woven polyester mat with continuous glass fiber yarn)

d. **Heat Fused Aluminum Clad Flashing Plies:**
   1) **Cap Ply**: Firestone SBS Metal Flash-AL, (150 mils/3.8.mm thick; weight 100 lbs. per square with glass fiber/scrim mat).
   2) **Stripping Ply**: Firestone SBS Smooth (140 mils/3.6 mm thick; weight 90 lbs. per one square roll; with glass yarn/polyester mat) hot mopped.

e. **Cold Adhesive:** Firestone MB Cold Adhesive

3. **Johns Manville Corporation**

a. **Field Plies:**
   1) **Cap Sheet**: DynaGlas FR (3.8 mm thick, weight 95 lbs per square; with Fiberglas Mat).
   2) **Interply**: DynaLastic 180 S (3.0 mm thick; weight 90 lbs per square; with Polyester reinforcement).

b. **Mopped Granular Flashing Plies:**
   1) **Cap Ply**: DynaGlas FR (3.8 mm thick, weight 95 lbs. per square; with Fiberglas Mat).
   2) **Stripping Ply**: DynaLastic 180 S (3.0 mm thick; weight 90 lbs. per square; with Polyester reinforcement).

c. **Heat Fused Granular Flashing Plies:**
   1) **Cap Ply**: Dynaweld Cap FR (165 mils/4.2 mm thick; weight 106 lbs. per one square roll; with fiberglass reinforcement mat).
   2) **Stripping Ply**: Dynaweld 180S (118 mils/3.0 mm thick; weight 86 lbs. per one square roll; with polyester mat with bidirectional glass-scrim reinforcement)

d. **Heat Fused Aluminum Clad Flashing Plies:**
   1) **Cap Ply**: DynaClad (158 mils/4.0 mm thick; weight 101 lbs per square, with fiberglass mat.
   2) **Stripping Ply:** DynaLastic 180 S (3.0 mm thick; weight 90 lbs. per square; with Polyester reinforcement) hot mopped

e. **Cold adhesive**: MBR

4. Polyglass U.S.A. Inc.:

Field Plies:

Cap Sheet: Elastoflex S6G FR (157 mils/4.0 mm thick; weight 102 lbs. per roll; with reinforced polyester reinforcement).
Interply: Elastoflex V (120 mils/3.0 mm thick; weight 84 lbs. per roll; with glass fiber reinforcement).

Mopped Granular Flashing Plies:

Cap Ply: Elastoflex S6G FR (157 mils/4.0 mm thick; weight 102 lbs. per roll, with reinforced polyester reinforcement).
Stripping Ply: Elastoflex V (120 mils/3.0 mm thick; weight 84 lbs. per roll; with glass fiber reinforcement).

Heat Fused Granular Flashing Plies:

Cap Ply: Elastoflex S6 FR (157 mils/4.0 mm thick; weight 102 lbs. per roll; with a reinforced polyester reinforcement).
Stripping Ply (Non-combustible substrates): Elastoflex V (120 mils/3.0 mm; weight 84 lbs. per roll; with glass fiber reinforcement).
Stripping Ply (Combustible substrates): Elastoflex SA V (80 mils/2.0mm; weight 95 lbs. per roll; with a glass fiber reinforcement).

Cold adhesive: PG 350 or PolyPlus 35 Modified Bitumen Adhesive

5. Siplast Inc.:

Field Plies:

Cap Sheet: Paradiene 30 FR (98 mils/2.5mm thick; weight 90 lbs. per square; with fiberglass mat).
Interply: Paradiene 20 EG (3.0 mm thick; weight 84 lbs. per square; with fiberglass scrim/fiberglass mat).

Mopped Granular Flashing Plies:

Cap Ply: Parafor 50LT (157 mils/ 4.0 mm thick; weight 129 lbs per square, with polyester/fiberglass mat reinforcement).
Stripping Ply: Paradiene 20 EG (3.0 mm thick; weight 84 lbs. per square; with fiberglass scrim/fiberglass mat).

Heat Fused Granular Flashing Plies:

Cap Ply: Parafor 30 TG (161 mils/ 4.1 mm thick; weight 114 lbs. per square; with a fiberglass scrim/polyester mat composite).
Stripping Ply (Non-combustible substrates): Paradiene 20 TG (114 mils/2.9mm; weight 76 lbs. per square; with fiberglass mat).
Stripping Ply (Combustible substrates): Paradiene 20 SA (102 mils/2.6mm; weight 72 lbs. per square; with a fiberglass mat).

Heat Fused Aluminum Clad Flashing Plies:

Cap Ply: Veral Aluminum (138 mils/3.8 mm thick; weight 82 lbs. per square; with fiberglass scrim)
Stripping Ply: Irex 40 (110 mils/2.8mm; weight 85 lbs. per square; with lightweight random fiberglass mat)

Cold adhesive: PA-311

6. SOPREMA, Inc.

Field Plies:

Cap Sheet: Sopralene 180 Granules FR; (160 mils/4.0 mm thick, weight 108 lbs per square; polyester reinforced).
Interply: Sopralene 180 sanded 2.2, polyester reinforced (90 mils/2.2 mm thick, 58 lbs. per square).

Mopped Granular Flashing Plies:

Cap Ply: Sopralene 180 Granules FR; (160 mils/4.0 mm thick, weight 108 lbs. per square; polyester reinforced).
Stripping Ply: Sopralene 180 sanded 2.2, polyester reinforced (90 mils/2.2 mm thick, 58 lbs. per square).

Heat Fused Granular Flashing Plies:

Cap Ply: Sopralene Flam 180 FR GR; (157 mils/4.0mm thick, weight 118 lbs. per one square roll; with a non-woven polyester mat)
Stripping Ply: Sopralene Flam 180; (118 mils/3.0mm thick, weight 81 lbs. per one square roll; with a non-woven polyester mat)

Heat Fused Aluminum Clad Flashing Plies:
Cap Ply: Sopralast TV Aluminum, fiberglass reinforced (162 mils/4.2 mm thick, 97 lbs per square), torch applied.
Stripping Ply: Sopralene Flam 180

Cold Adhesive: Colply

7. U. S. Ply, Inc.

Field Plies:
Cap Sheet: Duraflex 190FR SBS (170 mils/4.3 mm thick; weight 105 lbs per square; with a non-woven polyester mat).
Interply: Duraflex 190S SBS (120 mils/3.0 mm thick; weight 88 lbs per square; with a non-woven polyester mat).

Mopped Granular Flashing Plies:
Cap Ply: Duraflex 190FR SBS (170 mils/4.3 mm thick; weight 105 lbs. per square; with a non-woven polyester mat).
Stripping Ply: Duraflex 190S SBS (120 mils/3.0 mm thick; weight 88 lbs. per square; with a non-woven polyester mat).

Heat Fused Granular Flashing Plies:
TBD

Heat Fused Aluminum Clad Flashing Plies:
Cap Ply: Duraflex Aluminum SBS (140 mils/3.5 mm thick; weight 103 lbs per square; with a fiberglass mat).
Stripping Ply: Duraflex 190S SBS (120 mils/3.0 mm thick; weight 88 lbs. per square; with a non-woven polyester mat) hot mopped.

Cold Adhesive: 901 Premium Modified Adhesive

1.5 SUBMITTALS

A. Product Data: Manufacturer's data sheets for each product to be provided.

B. Detail Drawings: Provide roofing system plans, elevations, sections, details, and details attachment to other Work, including:

1. Base flashings, cants, penetration flashing, and membrane terminations.
2. Insulation, Contractor shall field-verify all roof dimensions and roof slopes.
3. Crickets, saddles, and tapered edge strips, including slopes.
4. Insulation fastening patterns, showing adherence to wind uplift requirments with variations for field, perimeter, and corner areas.
5. Basic detailing shall follow recommendations of the latest edition of the NRCA Roofing and Waterproofing Manual.

C. Verification Samples: Provide for each product specified.

D. Maintenance Data: Submitted as per warranted roofing manufacturer..

E. Guarantees: Provide manufacturer's State of Louisiana guarantee specimen.

F. Roofing Information: At the end of the project, Roofing Contractor shall provide three (3) copies of Roofing Information, complete and as per Specification Section 01 78 23.

G. MSDS Sheets: For all roofing products, Roofing Manufacturer shall furnish to the Roofing Contractor all MSDS sheets incorporating OSHA approved form, current edition, which shall be available at all times at the project site.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive the specified manufacturer's guarantee.

1. The Roofing Contractor shall provide a current letter or Certificate of Certification issued by the Roof System Manufacturer that indicates he has attained the highest level of certification as an installer of the roof system specified that is issued by the manufacturer. This letter or certificate shall be submitted electronically to the Designer as part of the roofing submittals prior to ordering roofing materials.
2. Prior to Preliminary Roofing Conference, submit roofing manufacturer's proposed assembly letter to F P & C for approval.
3. Prior to Preliminary Roofing Conference, submit Labor Burden information sufficiently in advance to allow for review and approval by FP&C and Architect.

B. Manufacturer Qualifications: Qualified manufacturer that has a UL listing for roofing system identical to that used for this Project.

C. Source Limitations: Obtain all components from the single source roofing system manufacturer guaranteeing the roofing system. All products used in the system shall be labeled by the single source roofing manufacturer issuing the guarantee.

D. Provide evidence of CERTA training for any installer of torch-applied modified bitumen membrane. Copies of certifications are required prior to award and must be maintained on the jobsite for inspection at any time.

E. Fire-Test-Response Characteristics: Roofing materials shall comply with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.

1. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.
2. Fire-Resistance Ratings: ASTM E 119, for fire-resistance-rated roof assemblies of which roofing system is a part.

F. Roofing Conferences: The following roofing conferences will be held: Pre-Construction Conference, Preliminary Roofing Conference, Pre-Application Roofing Conference, Pre-Closeout, Roofing Final Inspection, and Wrap-up Conference. Architect shall provide a sample agenda for these conferences which shall be attended by Owner, Architect, Roofing Contractor, Roofing Manufacturer Representative, and any other appropriate parties.

G. Roofing Inspections: Owner, Architect, Roofing Contractor, Roofing Manufacturer representative shall make inspections of the roofing system toward the end of the Roofing Contractor's one (1) year and

two (2) year guarantee period. Roofing Manufacturer authorized technical representative shall inspect the roofing system near the close of the Manufacturer's Guarantee and shall submit a written report to the Architect and the Owner within seven (7) days of each inspection, and prior to the expiration of their 20 year warranty.

H. Roof Completion Information: Contractor shall complete and provide to Designer copies of FP&C "Roof Completion Information" forms for each Roof Section.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials 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.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when current and forecasted weather conditions permit roofing system to be installed in accordance with manufacturer's written instructions and guarantee requirements.

1.9 GUARANTEE

A. Provide State of Louisiana-approved manufacturer's system guarantee. Sample included in this Specification.

1. Single-Source special guarantee includes roofing plies, base flashings, liquid applied flashing, roofing membrane accessories, granule surfaced roofing membrane, roof insulation, fasteners, cover board, walkway products and other single-source components of roofing system marketed by the manufacturer.
2. Guarantee Period: 20 years from Notice of Date of Acceptance as established by Designer and approved by FP&C.
3. Upon successful completion of the project, and after all post installation procedures have been completed, the Contractor shall furnish the Owner with the Manufacturer's twenty (20) year NDL labor and materials membrane guarantee acceptable to the State of Louisiana. FP&C has developed a specific warranty format that is acceptable to the State of LA. No changes to the approved manufacturer's warranty are allowed without the consent of the State of LA.
4. Provide Manufacturer's statement certifying roofing warranty is in effect.

B. Installer's Guarantee: Submit roofing Installer's guarantee, signed by Installer, covering Work of this Section, including all components of roofing system, for the following guarantee period:

1. Guarantee Period: Two (2) years from Notice of Date of Acceptance, as established by Designer and approved by FP&C.

2. Roofing Contractor shall execute and provide to the Owner two (2) copies of the Roofing Guarantee R-1, a sample form of which is included in these Specifications, to the Architect at the successful completion of the project. Project will not be accepted by the Owner until the Guarantee and Roof Completion Information form are received and accepted by the Owner.
3. Provide Contractor's statement certifying that roofing warranty is in effect.

C. Aesthetic Considerations:

1. The overall appearance of the finished roof application is a standard requirement for this project. The contractor shall make necessary preparations, utilize recommended application techniques, apply the specified materials and exercise care in ensuring that the finished application is acceptable to the owner. If roofer works over a completed area and soils it, layer will be replaced or overlaid with another finish ply of roofing as directed by roofing system manufacturer.

D. Contractor shall provide a certificate identifying that all roofing materials used on the project do not contain asbestos.

PART 2 - PRODUCTS

2.1 BASE PLY AND CAP-SHEET MATERIALS

A. See Paragraph 1.4

2.2 FLASHING SHEET MATERIALS

A. See Paragraph 1.4

2.3 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with built-up roofing.

B. Roofing Asphalt: ASTM D 312, Type IV.

C. Asphalt Primer: ASTM D 41.

D. Cold-Applied Flashing Adhesive: Roofing system manufacturer's asphalt-based, two-component, asbestos-free, trowel-grade, cold-applied adhesive specially formulated for compatibility and use with flashing applications, with reinforcing fabric. Use for all cold pipe/cold duct penetrations including roof drains, as per roofing manufacturer recommendations.

E. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roofing membrane components to substrate, tested by manufacturer for required pullout strength, and provided by the roofing system manufacturer. Fasteners appropriate for the roof deck shall be used as required by roofing manufacturer for their system design.

F. Roofing Granules: Ceramic-coated roofing granules matching specified cap sheet, provided by roofing system manufacturer.

G. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer.

2.4 WALKWAYS

A. Walkway Pads: Mineral-granule-surfaced, reinforced modified asphalt composition, slip-resisting pads, manufactured as a traffic pad for foot traffic provided by roofing system manufacturer, with a pad size of 32 inch x 32 inch or roofing manufacturer's standard dimensions. See Drawings for locations.

2.5 COVER BOARD

A. Type of coverboard shall be as included by Roofing Manufacturer in their total roofing system, as per the State of Louisiana-approved system list.

2.6 ROOF INSULATION

A. General: Provide preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated and as required by roofing manufacturer for attachment method.

B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2 (20 psi),

1. Provide insulation package with minimum thickness as shown on the Drawings.
2. Minimum Long-Term Thermal Resistance (LTTR): 5.7 per inch.

    a. Determined in accordance with CAN/ULC S770 at 75ºF (24ºC)

2.7 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.

B. Provide factory preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated and/or required by existing conditions.

C. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening roof insulation to substrate, and furnished by roofing system manufacturer. Fasteners used, as an addition to asphalt attachment, only if required by roofing manufacturer for their system design.

D. Insulation Cant Strips: ASTM C 728, perlite insulation board.

E. Wood Nailer Strips: Comply with requirements in Division 06 Section "Rough Carpentry."

2.8 AUXILIARY ROOFING SYSTEM COMPONENTS

A. 07 Section "Sheet Metal Flashing and Trim."

B. Contractor shall provide products acceptable to roofing manufacturer as needed by existing conditions to provide acceptable performance of roofing system, whether pre-fabricated or custom-fabricated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions for compliance with the requirements affecting performance of roofing system.

1. General:
   a. Verify that roof openings and penetrations are in place and set and braced.
   b. Verify that cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation/cover board.
   c. Provide documentation of wind uplift resistance values using manufacturer's approved procedures.
   d. Minimum fastening patterns are as follows, spaced equally over 4' x 8' base sheet of roof insulation on metal deck:
      1) Field - sixteen (16)
      2) Perimeter - twenty-four (24)
      3) Corner - thirty-two (32) or sixteen (16) for a 4' x 4' sheet

   e. Minimum fastening/adhesion for concrete decks is a full mopping of asphalt.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean and remove from substrate sharp projections, dust, debris, moisture, and other substances detrimental to roofing system installation in accordance with roofing system manufacturer's written instructions.

B. Prevent materials from spilling or migrating onto surfaces of other construction.

C. If applicable, prime surface of deck with asphalt primer at a rate recommended by roofing manufacturer and allow primer to dry.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSULATION INSTALLATION

A. Coordinate installation of roof system components so insulation and cover board are not exposed to precipitation or left exposed at the end of the workday.

B. Comply with roofing system manufacturer's written instructions for installation of roof insulation.

C. Insulation Cant Strips: Install and secure preformed 45-degree insulation cant strips at junctures of roofing membrane system with vertical surfaces or angle changes greater than 45 degrees per manufacturer's instruction.

D. Install insulation boards with long joints in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with like material.

E. Install 2 or more layers, if indicated on Drawings, with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.

F. If needed, install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.

G. Adhered Insulation: Install each layer of insulation and adhere to substrate as follows:

1. Install each layer in a solid mopping of hot roofing asphalt according to roofing system manufacturer's instruction.
2. Install each layer to resist uplift pressure at corners, perimeter, and field of roof.

H. Proceed with installation only after unsatisfactory conditions have been corrected.

3.4 COVER BOARD INSTALLATION

A. Coordinate installing membrane roofing system components so cover board is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with membrane roofing system manufacturer's written instructions for installing roof cover board.

C. Install cover board with long joints of cover board in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with cover board.

1. Cut and fit cover board within 1/4 inch (6 mm) of nailers, projections, and penetrations.
2. Stagger joints 6" min. in both directions from roof insulation boards.

D. Adhered Cover Board: Adhere cover board to substrate as follows:

1. Install in a solid mopping of hot roofing asphalt according to roofing system manufacturer's instruction.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.5 ROOFING MEMBRANE INSTALLATION, GENERAL

A. Install roofing membrane in accordance with roofing system manufacturer's written instructions, applicable recommendations of the roofing manufacturer and requirements in this Section.

B. Start installation of roofing membrane in presence of roofing system manufacturer's technical personnel.

C. Where roof slope exceeds 1/2 inch per 12 inches (1:24) contact the membrane manufacturer for installation instructions regarding installation direction and backnailing

D. Cooperate with testing and inspecting agencies engaged or required to perform services for installing roofing system.

E. Coordinate installing roofing system so insulation and other components of the roofing membrane system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is imminent.

1. Provide tie-offs at end of each day's work to cover exposed roofing membrane sheets and insulation with a course of coated felt set in roofing cement or hot roofing asphalt with joints and edges sealed.
2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.
3. Remove and discard temporary seals before beginning work on adjoining roofing.

F. Asphalt Heating: Heat roofing asphalt to temperature recommended by roofing manufacturer to flux modified membrane. Do not exceed roofing asphalt manufacturer's recommended temperature limits during roofing asphalt heating. Discard roofing asphalt maintained at a temperature exceeding finished blowing temperature for more than 4 hours.

Contractor shall maintain a written record of asphalt temperatures at application locations, at hourly intervals. Contractor shall provide copies of this record to Designer on a weekly basis at the end of each week.

G. Substrate-Joint Penetrations: Prevent roofing asphalt from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction.

H. Proceed with installation only after unsatisfactory conditions have been corrected.

3.6 SBS-MODIFIED BITUMINOUS MEMBRANE INSTALLATION

A. Install one modified bituminous roofing membrane sheet and cap sheet according to roofing manufacturer's written instructions, starting at low point of roofing system. Extend roofing membrane sheets over and terminate beyond cants, with the following installing methods:

1. Unroll roofing membrane sheets and allow them to relax for minimum time period required by manufacturer.
2. Adhere to substrate in a solid mopping of hot roofing asphalt applied at temperatures recommended by roofing system manufacturer.

B. Laps: Accurately align roofing membrane sheets, without stretching, and maintain uniform side and end laps. Stagger end laps. Completely bond and seal laps, leaving no voids.

1. Repair tears and voids in laps and lapped seams not completely sealed.
2. Apply roofing granules to cover exuded bead at laps while bead is hot.

C. Install roofing membrane sheets so side and end laps shed water.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

E. Once interply sheet has been installed, flood test roof to verify whether ponding areas are present or not. If any ponded areas are found, install additional sections of interply sheets in those areas to eliminate ponding. Designer and possibly Owner shall be present to observe flood test and shall follow up to observe remediated areas.

Contractor shall repeat this procedure until all ponded areas are eliminated.

Contractor shall document by photographs and drawings, all the locations and dimensions of all remedial interply installation as an as-built condition. This information to be provided to Designer.

Ensure to flood test interply to eliminate ponding at interply prior to any cap sheet application(s) to avoid run-off asphaltic bleed onto new cap sheets.

3.7 FLASHING AND STRIPPING INSTALLATION

A. Install base flashing over cant strips and other sloping and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrates according to roofing system manufacturer's written instructions and as follows:

1. Prime substrates with asphalt primer if required by roofing system manufacturer.
2. Backer Sheet Application: Install backer sheet and torch apply substrate as required by roofing system manufacturer.
3. Flashing Sheet Application: Torch apply flashing sheet to substrate as required by roofing system manufacturer.

B. Extend base flashing up walls or parapets a minimum of 8 inches (200 mm) above roofing membrane and 4 inches (100 mm) onto field of roofing membrane.

C. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.
1. Seal top termination of base flashing with a strip of glass-fiber fabric set in flashing cement so that joint is water-tight.

D. Flash all cold pipe penetrations and all roof drains and sump areas, as per roofing manufacturer, using roofing manufacturer's liquid applied membrane flashing system.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.8 WALKWAY INSTALLATION

A. Walkway Pads: Install walkway pads using units of size indicated or, if not indicated, of manufacturer's standard size according to walkway pad manufacturer's written instructions. See Drawings for locations.

1. Sweep away loose aggregate surfacing and set walkway pads in additional flood coat of hot roofing asphalt.

B. Walkway Cap Sheet Strips: Install roofing membrane walkway cap sheet strips over roofing membrane.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.9 FIELD QUALITY CONTROL

A. Testing Agency: Owner may engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.

B. Repair or remove and replace components of roofing system where test results or inspections indicate that they do not comply with specified requirements.

C. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.10 PROTECTION AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period.

B. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07 52 16

SECTION 07 60 00

FLASHING AND SHEET METAL

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: Provide flashing and sheet metal not specifically described in other Sections of these Specifications but required to prevent penetration of water through the exterior shall of the building.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. In addition to complying with pertinent codes and regulations, comply with pertinent recommendations contained in current edition of "Architectural Sheet Metal Manual" published by the Sheet Metal and Air-conditioning Contractors National Association (SMACNA).

C. Standard commercial items may be used for flashing, trim, reglets and similar purposes provided such items meet or exceed the quality standards specified.

1.3 SUBMITTALS

A. Comply with pertinent provisions of Section 01 33 00, Submittal Procedures.

B. Product data: Within 45 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

1. Materials list of items proposed to be provided under this Section;
2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;
3. Shop Drawings in sufficient detail to show fabrication, installation, anchorage and interface of the work of this Section with the work of adjacent trades;
4. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the work.
5. Samples, 8" x 8" of each type of material proposed to be used.

1.4 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01 66 00, Product Storage and Handling Requirements.

PART 2 PRODUCTS

2.1 MATERIALS AND GAGES

A. Where sheet metal is required, and no material or gage is indicated on Drawings provide the highest quality and gage commensurate with the referenced standards.

2.2 PREFINISHED STEEL SHEETS

A. 26 gauge, hot dipped galvanized steel (G90) commercial quality, primed and finished on one (1) side with Kynar 500 fluoropolymer coating 1.0 mil DPT. Vincent “Color Clad”, Petersen “Pac-Clad”, or approved equal.

2.3 ALUMINUM

A. Provide prefinished aluminum .040” thickness, Kynar 500 or equal coating, .040" thickness, typical where indicated on the Drawings, and as needed for complete weathertightness.

B. Zinc Coating:

1. Where galvanizing is required, provide zinc coating by hot-dip galvanize to all surfaces.
2. Weight - Provide not less than 1-1/4" oz. per sq. ft., nor more than 1-1/2 oz. per sq. ft., to surfaces required to be galvanized.
3. Comply with ASTM A93.

2.4 NAILS, RIVETS AND FASTENERS

A. Use only soft iron rivets having rust-resistive coating, galvanized nails and cadmium plated screws and washers in connection with galvanized iron and steel.

B. Use color-coordinated prefinished fasteners where fasteners will be visible.

C. Use fasteners of same or compatible metal with respective flashing metal type.

2.5 FLUX

A. Where flux is required, use raw muriatic acid.

2.6 SOLDER

A. Where solder is required, comply with ASTM B32.

2.7 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

B. Flashing: Where indicated on the Drawings, provide .040” aluminum, prefinished in color selected by Architect. Install with concealed clips or “zee” channels to avoid through-fasteners. Submit shop drawings of profiles for Architect’s review and approval.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 WORKMANSHIP

A. General:

1. Form sheet metal accurately and to the dimensions and shapes required, finishing molded and broken surfaces with true, sharp and straight lines and angles and, where intercepting other members, coping to an accurate fit and soldering securely.
2. Unless otherwise specifically permitted by the Architect, turn exposed edges back 1/2".

B. Form, fabricate and install sheet metal so as to adequately provide for expansion and contraction in the finished work.

C. Weatherproofing:

1. Finish watertight and weathertight where so required.
2. Make lock seam work flat and true to line, sweating full of solder.
3. Make lock seams and lap seams, when soldered, at least 1/2" wide.
4. Where lap seams are not soldered, lap according to pitch, but in no case less than 3".
5. Make flat and lap seams in the direction of flow.
6. At roof edge flashing, provide splice plates 8" wide, centered on joint, embed in sealant, all hidden fasteners. Under each joint, install a section of flexible flashing membrane 8" wide by the depth of the metal flashing less 1/2" each end, equal to WR Grace or Firestone.
7. Where metal flashing extends underneath siding or roofing material, typically provide a hemmed edge to prevent passage of water. Secure hemmed edge with clips or large head nails adjacent to hemmed edge - do not penetrate flashing with fasteners.
8. Use two-part "snap-lock" flashing/counterflashing as per details at roof-wall intersections.

D. Joints:

1. Join parts with rivets or sheet metal screws only where absolutely necessary for strength and stiffness. Typically install with hemmed edges over concealed clips or zee-clips.
2. Provide suitable watertight expansion joints for runs of more than 40"-0", except where closer spacing is indicated on the Drawings or required for proper installation.
3. At all parapet coping and expansion joint covers, all joints to be 1/2" tall standing seam.

E. Nailing:

1. Secure metal by means of concealed clips or cleats, without nailing through the metal, unless absolutely necessary to be done otherwise.
2. In general, space nails, rivets and screws not more than 8" apart and, where exposed to the weather, use lead washers.
3. For nailing into wood, use barbed roofing nails 1-1/4" long by 11 gage.
4. For nailing into concrete, use drilled plugholes and plugs.
5. All nails or fasteners shall be prefinished to match metal finish.

3.3 EMBEDMENT

A. Embed metal in connection with roofs in a solid bed of sealant, using materials and methods described in Section 07 92 00 of these Specifications or other materials and methods approved in advance by the Architect.

3.4 TESTS

A. Upon request of the Architect, demonstrate by hose or standing water that the flashing and sheet metal are completely watertight.

3.5 CLEAN-UP

A. Cleaning: After completion of work, remove all debris from site. Clean roofing cement, sealant, and paint from flashing, floors, and adjacent surfaces. Remove strippable film from flashing. Leave all surfaces neat and clean.

END OF SECTION

SECTION 07 84 00

FIRESTOPPING

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: Above finished ceilings provide metal studs, fire-resistant gypsum board, sealant systems and accessories at all walls within the project area which are smoke barriers, as specified herein, and as needed for a complete and proper installation.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions and Section in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. In addition to complying with the pertinent codes and regulations of government agencies having jurisdiction, comply with pertinent recommendations contained in the Fire Resistance Directory (1991) of the Underwriters Laboratories for specific fire rated sealant system.

1.3 SUBMITTALS

A. Comply with pertinent provisions of Section 01 33 00, Submittal Procedures.

B. Product data: Within 45 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

1. Materials list of items proposed to be provided under this Section.
2. Manufacturer's specifications and other data needed to provide compliance with the specified requirements.
3. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

1.4 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01 66 00, Product Storage and Handling Requirements.

PART II PRODUCTS

2.1 SEALANT SYSTEMS

A. Acceptable products are by Bio-Fireshield, Inc., Metalines, Inc., Nelson Electric, Dow-Corning, Thermal Ceramics or other manufacturers and products approved by the Architect to be equal.

PART III EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Identify new walls within the project area which are barriers meant to resist passage of smoke only or are also meant to resist the spread of fire. Determine the hourly rating of any fire barrier. Verify any questionable conditions with Architect.

B. Install additional gypsum board on metal framing as appropriate to seal large openings in any barrier. Comply with appropriate UL Design for all closure walls at barrier. Verify proposed method of closure with Architect prior to start of Work.

C. Locate all new penetrations through barrier wall. Identify penetration as to type: metal electrical conduit, telephone cable, PVC plumbing line (sewer, vent or water supply), metal plumbing line (sewer, vent or water supply), HVAC ductwork, etc. Identify all penetrations as to size. Indicate location of all penetrations on Drawings as part of work required by Section 01 78 39, Project Record Documents.

D. Select appropriate sealant system according to type and size of penetration and type of barrier wall. Provide list of proposed systems to Architect for his review and approval prior to installation.

E. After receiving Architect's approval, install all sealant systems according to manufacturer's recommendations to provide a complete and durable seal around the penetration.

PART IV GUARANTEE

4.5 GUARANTEE/WARRANTY

A. Submit written guarantee agreeing to repair or replace sealants which fail performance as fire-resistant, smoke-tight and water-tight joints or fail in joint adhesion or cohesion, abrasion resistance, water resistance, extrusion resistance, migration resistance, stain resistance and general durability; or appears to deteriorate in any other manner not clearly specified by submitted manufacturer's data, as inherent quality of material for exposure indicated. Guarantee for two (2) year period, signed by Applicator and Contractor.

END OF SECTION

SECTION 07 90 00

SEALANTS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes sealants and joint backing, precompressed foam sealers, and accessories.

B. Related Sections:
1. Section 04 20 00 - Unit Masonry
2. Section 04 22 00 - Concrete Unit Masonry
3. Section 07 10 50 - Cold Fluid-Applied Waterproofing
4. Section 07 84 00 - Firestopping: Firestopping sealants.
5. Section 08 80 00 - Glazing: Glazing sealants and accessories.
6. Section 09 29 00 - Gypsum Board

1.2 REFERENCES

A. ASTM C834 - Latex Sealing Compounds.

B. ASTM C919 - Practice for Use of Sealants in Acoustical Applications.

C. ASTM C920 - Elastomeric Joint Sealants.

D. ASTM C1193 - Guide for Use of Joint Sealants.

E. ASTM D1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Products Data: Submit data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.

C. Manufacturer's Installation Instructions: Submit special procedures, surface preparation, and perimeter conditions requiring special attention.

D. Warranty: Include coverage for installed sealants and accessories failing to achieve airtight seal, watertight seal, exhibit loss of adhesion or cohesion, and sealants, which do not cure.

1.4 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with documented experience.

B. Applicator: Company specializing in performing Work of this section with documented experience and approved by manufacturer.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Section 01 66 00 – Product Storage and Handling Requirements.

B. Maintain temperature and humidity recommended by sealant manufacturer during and after installation.

1.6 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Coordinate Work with sections referencing this section.

PART 2 PRODUCTS

2.1 JOINT SEALERS

A. Manufacturers:
1. Dow Corning Corp.
2. GE Silicones.
3. Pecora Corp.
4. Sika Corp.
5. Substitutions: Section 01 33 00 – Submittal Procedures.

B. Products Description:
1. High Performance General Purpose Exterior (Nontraffic) Sealant: Sealant Type I: polyurethane, ASTM C920, Grade P, Class 25; single component.
   a. Color: Standard colors matching finished surfaces.
   b. Applications: Use for:
      1) Control, expansion, and soft joints in masonry.
      2) Joints between concrete and other materials.
      3) Joints between metal frames and other materials.
      4) Other exterior nontraffic joints for which no other sealant is indicated.
      5) Joints between cement board wall panels and between cement board wall panels and dissimilar materials: Sealant manufacturer shall obtain certification from cement board manufacturer accepting products for applications detailed and confirming bondability to panel surfaces.
2. General Purpose Traffic Bearing Sealant Type 2: Polyurethane; ASTM C920, Grade P, Class 25; single or multi-component, self leveling.
   a. Color: Standard colors matching finished surfaces.
   b. Applications: Use for exterior and interior pedestrian and vehicular traffic bearing joints.
3. Exterior Foam Expansion Joint Sealer Sealant Type 3: Precompressed foam sealer; Polyurethane with water-repellent.
   a. Color: Face color as selected to match masonry grout color.
   b. Size: As required to provide weathertight and watertight seal when installed.
   c. Applications: Use for exterior wall expansion joints.
4. Sealant Backer Rod: Compressible rod stock open cell polyurethane foam. Provide size and shape of rod which will control joint depth for sealant placement, break bond of sealant at bottom of joint, form optimum shape of sealant bead on back side, and provide a highly compressible backer to minimize the possibility of sealant extrusion when joint is compressed.
5. General Purpose Interior Sealant: Sealant Type 5 Acrylic emulsion latex; ASTM C834, single component, paintable.
   a. Color: Standard colors matching finished surfaces.
   b. Applications: Use for interior wall and ceiling control joints, joints between door and window frames and wall surfaces, and other interior joints for which no other type of sealant is indicated.
6. Plumbing Fixtures/Tile Sealant: Sealant Type 6: Clear silicone; ASTM C920; single component, mildew resistant.
   a. Applications: Use for joints between plumbing fixtures and floor and wall surfaces, and joints between countertops and wall surfaces.

2.2 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backing: Round foam rod compatible with sealant; ASTM D1056, sponge or expanded

rubber; oversized 30 to 50 percent larger than joint width.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify substrate surfaces and joint openings are ready to receive work.

B. Verify joint backing and release tapes are compatible with sealant.

3.2 PREPARATION

A. Remove loose materials and foreign matter impairing adhesion of sealant.

B. Clean and prime joints.

C. Perform preparation in accordance with ASTM C1193.

D. Protect elements surrounding Work of this section from damage or disfiguration.

3.3 INSTALLATION

A. Perform installation in accordance with ASTM C1193.

B. Perform acoustical sealant application work in accordance with ASTM C919.

C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer.

D. Install bond breaker where joint backing is not used.

E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

G. Tool joints concave unless detailed otherwise.

H. Pre-compressed Foam Sealant: Do not stretch; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch below adjoining surface.

I. Compression Gaskets: Avoid joints except at ends, corners, and intersections; seal joints with adhesive; install with face 1/8 to 1/4 inch below adjoining surface.

3.4 CLEANING

A. Section 01 74 23 - Final Cleaning.

B. Clean adjacent soiled surfaces.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

A. Section 01 74 23 – Final Cleaning.

B. Protect sealants until cured.

END OF SECTION

SECTION 07 92 00

JOINT SEALANTS

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: Work of this Section includes caulking and sealing complete.

1. Caulking compound used on interior joints where caulking is indicated.
2. Sealing compound, including back-up filler, used primarily for exterior work, perimeters of exterior windows, doors, louvers and panels, control joints in masonry and elsewhere as indicated by "Sealant" on Drawings.
3. Sealant for glazing specified in Section 08 80 00, Glazing.

1.2 APPLICABLE STANDARDS

A. The following standards form part of this Specification as indicated by references thereto:

1. Federal Specifications (FS):
   a. TT-C-00598B(2) - "Caulking Compound, Oil and Resin Base, Type for Building Construction
   b. TT-S-001543A (COM-NBS) - "Sealing Compound: Silicone Rubber Base (for Caulking, Sealing and Glazing in Buildings and other Structures)"
2. American Association for State Highway Officials (AASHO):
   a. M 543-54 - "Preformed Expansion Joint Fillers for Concrete"

1.3 QUALITY ASSURANCE

A. Submit brand name of products intended for use for approval before proceeding with work.

B. Applicator must have minimum five (5) years successful experience in application of types of materials and who agrees to employ only skilled tradesmen for caulking and sealing work.

C. Obtain elastomeric materials only from manufacturer who will, if required, send qualified technical representative to project site for purpose of advising applicator of proper schedules and precautions for proper use of materials.

1.4 SAMPLES

A. Submit samples of each color of sealant and caulking required for each type of compound exposed to view. Samples reviewed by Architect for color and texture only. Compliance with other requirements is the responsibility of the Contractor.

1.5 GUARANTEE

A. Submit written guarantee agreeing to repair or replace sealants which fail performance as air-tight and water-tight joints or fail in joint adhesion or cohesion, abrasion resistance, water resistance, extrusion resistance, migration resistance, stain resistance and general durability; or appears to deteriorate in any other manner not clearly specified by submitted manufacturer's data, as inherent quality of material for exposure indicated. Guarantee for 2-year period, signed by Applicator and Contractor.

PART 2 PRODUCTS

2.1 MATERIALS

A. Caulking: Light color, elastic and waterproof; shall not stain or corrode metal; gum consistency, light grey color. Conform to TT-C-00598.

B. Sealant Backer Rod: Conform to requirements of AASHO M 543. Rod of polyethylene foam, soft extruded, flexible and compressible. White color, odorless, compression-deflection, 7 psi at 25%, tensile strength 20-30 psi, temperature resistance -40 degrees Fahrenheit. Foam compatible with butyl, polysulfide, polyurethane and silicone.

C. Sealant: Sealing compound conforming to TT-S-001543A.

D. Primer: Recommended by manufacturer of sealant.

PART 3 EXECUTION

3.1 PREPARATORY WORK

A. Carefully examine joint surfaces, backing and conditions under which caulking and sealing work is to be performed. Notify Architect, in writing, of conditions detrimental to proper and timely completion of work and sealant performance. Do not proceed with work until unsatisfactory conditions have been corrected.

B. Weather Conditions: Do not install under adverse weather conditions or when temperatures are below or above manufacturer's recommended limitations for installation. Proceed only when forecasted weather conditions are favorable for proper development of high early bond strength. Whenever joints set is affected by ambient temperature variations, install sealants only when temperatures are in lower third of manufacturer's recommended installation range, so sealant will not be subjected to excessive elongation and bond stress at subsequent low temperatures. Coordinate time schedule to avoid project delay.

C. Compatibility: Before purchase of sealant, investigate its compatibility with joint surfaces and other materials in joint system. provide only materials which are known to be fully compatible with actual installation conditions.

3.2 INSTALLATION - SEALING COMPOUND

A. Preparation of Joint Surface: Make sure, before sealing, that joints are free of dust, oil, grease, water, frost, loose mortar or other foreign materials. Remove dust or other loose debris with stiff brush or compressed air. Eliminate traces of oil, grease or lacquers with solvent wash, using toluene, xylene, or preferably methyl-ethyl ketone (MEK) applied with clean brush and wiped dry with frequently changed rags. Successful performance of sealant working joints depends on adhesion to joint surfaces. To obtain good adhesion, clean and dry joints are necessary and must be obtained.

B. Primer: Follow manufacturer's instructions on primer on various substrates. apply primer only to sides of working joints and not to back surfaces, wherever such separation is possible. Do not spill primer on unwanted surfaces; it may change appearance of some surfaces. apply primer along joint surfaces before insertion of backup filler. Use masking tape along joint edge before application of primer. Remove masking tape immediately after joint has been tooled, before sealant skins over.

C. Backup Filler: Fill joints to receive sealant to depth of 3/8" from face with polyethylene foam backer rod using diameter approximately 25% to 50% greater than joint width.

D. Sealant: Apply sealant directly from original package to joint or, if bulk purchase is made and cartridges or bulk guns are filled by other than manufacturer, containers must be free from contamination, including other sealants or caulking compounds. apply sealant with hand operated

caulking gun, air operated pressure gun or by use of pumps and hoses. Force sealant into joint in full bead, making certain that continuous void free contact is made with joint sides. Tool joints within 5 minutes of application to produce slightly concave surface and insure maximum contact with sides of joint and elimination of air pockets. Tolling may be done with metal or wooden pointing tool or with thumb, using water (with or without soap) or solvent for lubrication. Leave joint with smooth, slightly concave surface for neat workmanlike appearance. Remove sealant smears from metal or glass surfaces with solvent such a xylene, or methyl-ethyl ketone while sealant is still uncured. On porous surfaces, allow spills or smears to cure overnight, then remove by abrasion. Leave sealed joints undisturbed and protected from appreciable movement for at least 48 hours, preferably longer.

END OF SECTION

DIVISION 08
DOORS AND WINDOWS

CONTENTS

08 11 13	Standard Hollow Metal Doors & Frames
08 14 00	Wood Doors
08 41 13	Aluminum – Framed Entrances and Storefronts
08 71 00	Finish Hardware
08 80 00	Glazing

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

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, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Standard and custom hollow metal doors and frames.
2. Steel sidelight, borrowed lite and transom frames.
3. Louvers installed in hollow metal doors.
4. Light frames and glazing installed in hollow metal doors.

B. Related Sections:

1. Division 01 Section "General Conditions".
2. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
3. Division 08 Section “Flush Wood Doors”.
4. Division 08 Section "Glazing" for glass view panels in hollow metal doors.
5. Division 08 Section "Door Hardware".
6. Division 08 Section "Access Control Hardware".
7. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.

C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

8. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
9. 10. SDI-113 Standard Practice for Determining the Steady-State Thermal Transmittance of Steel Door & Frame Assemblies.
10. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
11. ASTM C1199 - Standard Test Method for Measuring the Steady-State Thermal Transmittance of Fenestration Systems Using Hot Box Methods
12. ASTM E1423 - Practice for Determining Steady State Thermal Transmittance of Fenestration Systems.
13. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
14. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
15. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
16. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
17. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
18. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
19. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.

B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.

C. Shop Drawings: Include the following:

1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of anchorages, joints, field splices, and connections.
6. Details of accessories.
7. Details of moldings, removable stops, and glazing.
8. Details of conduit and preparations for power, signal, and control systems.

D. Samples for Verification:

1. Samples are only required by request of the architect and for manufacturers that are not current members of the Steel Door Institute.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.

B. Quality Standard: In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".

C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL10C (neutral pressure at 40” above sill) or UL 10C.

1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.
2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
3. Smoke Control Door Assemblies: Comply with NFPA 105.

a. Smoke "S" Label: Doors to bear “S” label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.

D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.

E. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.

1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.7 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

B. Building Information Modeling (BIM) Support: Utilize designated BIM software tools and obtain training needed to successfully participate in the Project BIM processes. All technical disciplines are responsible for the product data integration and data reliability of their Work into the coordinated BIM applications.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide steel doors and frames from a SDI Certified manufacturer:

1. CECO Door Products (C).
2. Curries Company (CU).
3. Steelcraft (S).

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

2.3 HOLLOW METAL DOORS

A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8 and ANSI/NAAMM HMMA 867.

B. Exterior Doors: Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Design: Flush panel.
2. Core Construction: Manufacturer's standard polystyrene. Where indicated, provide doors fabricated as thermal-rated assemblies with a minimum R-value of 2.8 or better.
3. Level/Model: Level 3 and Physical Performance Level A (Extra Heavy Duty), Minimum 16 gauge (0.053-inch - 1.3-mm) thick steel, Model 2.
4. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
5. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
6. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

C. Interior Doors: Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A 1008/A 1008M. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Design: Flush panel.
2. Core Construction: Manufacturer's standard kraft-paper honeycomb, or one-piece polystyrene core, securely bonded to both faces.

    a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.

3. Level/Model: Level 3 and Physical Performance Level A (Extra Heavy Duty), Minimum 16 gauge (0.053-inch - 1.3-mm) thick steel, Model 2.
4. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet.
5. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
6. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

D. Manufacturers Basis of Design:

1. CECO Door Products (C) Polystyrene Core - Legion Series.

2.4 SPECIAL FUNCTION HOLLOW METAL DOORS

A. Sound Resistant Doors: Subject to the same compliance standards and requirements as standard hollow metal doors, provide manufacturer's standard sound resistant acoustic core tested in accordance with ASTM E90, ASTM 413, and ASTM E1332 standards. Fabricate with minimum 16 gauge construction, 1-3/4" thickness, combined with standard flush frames designed for mid-range and high range sound attenuation from STC 39 through STC 52 applications. Furnish complete with perimeter sound seals, bottom seals, and threshold as required for specified STC rating.

1. Provide sound resistant doors with minimum STC sound rating (32, 38, 41, 43, 46, 50, 52, 54) as indicated on the door schedule:

2. Each unit to bear a physical label applied to door certifying the product construction and identifying the specific STC rating.

3. Sound resistant doors shall be installed by factory trained and certified installers.

4. Manufacturers Basis of Design:

    a. CECO Door Products (C) - Sound-Tech Express Series.
    b. Curries Company (CU) - 757 Quiet Noise Series.

2.5 HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Exterior Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.

1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
2. Frames: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
3. Manufacturers Basis of Design:

    a. CECO Door Products (C) - SU SR Series.

C. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.

1. Fabricate frames with mitered or coped corners. Profile as indicated on drawings.
2. Frames: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
3. Manufacturers Basis of Design:

    a. CECO Door Products (C) - SU Series.

D. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

E. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

2.6 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.
3. Compression Type for Drywall Slip-on (Knock-Down) Frames: Adjustable compression anchors.

B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.

C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.7 LOUVERS

A. Metal Louvers: Unless otherwise indicated provide louvers to meet the following requirements.

1. Blade Type: Vision proof inverted V or inverted Y.
2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

B. 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.

1. Manufacturers: Subject to compliance with requirements, provide louvers to meet rating indicated.
2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

2.8 LIGHT OPENINGS AND GLAZING

A. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricator’s shop. Fixed and removable stops to allow multiple glazed lites each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.

B. Moldings for Glazed Lites in Doors and Loose Stops for Glazed Lites in Frames: Minimum 20 gauge thick, fabricated from same material as door face sheet in which they are installed.

C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames.

D. Preformed Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated. Match pre-finished door paint color where applicable.

2.9 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.10 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.

C. Hollow Metal Doors:

1. Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.
2. Glazed Lites: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicated.
3. Astragals: Provide overlapping astragals as noted in door hardware sets in Division 08 Section "Door Hardware" on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.
4. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".

D. Hollow Metal Frames:

1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.

    a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.

3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.

4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
7. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
8. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
9. Jamb Anchors: Provide number and spacing of anchors as follows:

    a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches on-center and as follows:

        1) Two anchors per jamb up to 60 inches high.
        2) Three anchors per jamb from 60 to 90 inches high.
        3) Four anchors per jamb from 90 to 120 inches high.
        4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.

    b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

        1) Three anchors per jamb up to 60 inches high.
        2) Four anchors per jamb from 60 to 90 inches high.
        3) Five anchors per jamb from 90 to 96 inches high.
        4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
        5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
10. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".
11. Bituminous Coating: Where frames are fully grouted with an approved Portland Cement based grout or mortar, coat inside of frame throat with a water based bituminous or asphaltic emulsion coating to a minimum thickness of 3 mils DFT, tested in accordance with UL 10C and applied to the frame under a 3rd party independent follow-up service procedure.

E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.

4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

2.11 STEEL FINISHES

A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

PART 3 - EXECUTION

3.1 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. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.

C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."

D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

E. Verify tolerances against manufacturers installations instructions for tornado and hurricane storm shelter openings.

3.3 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.

1. Set frames accurately in position, plumbed, leveled, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.

C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Standard Steel Doors:

a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow metal work immediately after installation.

C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

3.5 FIELD QUALITY CONTROL

A. Field Inspection (Punch Report): Reference Division 01 Sections “Closeout Procedures”. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

END OF SECTION 081113

SECTION 08 14 00

WOOD DOORS

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: Provide wood doors complete in place with finish hardware installed where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
2. Section 08 12 14, Standard Steel Frames.
3. Section 08 71 00, Finish Hardware.

C. Door Styles:

1. FLUSH

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. In addition to complying with pertinent codes and regulations of governmental agencies having jurisdiction, comply with:

1. "Architectural Woodwork Quality Standards" of the Architectural Woodwork Institute, for the grade and grades specified.
2. Certification and stamps will not be required.
3. Fire-Rated Wood Doors: Where fire-resistance classifications are shown or schedule for wood door assemblies, provide doors which comply with the requirements of NFPA No. 80 "Standards for Fire Doors and Windows" and which have been tested and rated with single point hardware by UL.
4. Provide UL Label on door and panel.

1.3 SUBMITTALS

A. Comply with pertinent provisions of Section 01 33 00, Submittal Procedures for submittals and substitutions.

B. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to proceed, submit:

1. Materials list of items proposed to be provided under this Section;
2. Manufacturer's specifications and other data needed to provide compliance with the specified requirements;
3. Samples, approximately 8"x 8" in size, of each of the proposed door face materials.

C. Warranty - Wood Doors: Submit written agreement in door manufacturer's standard form signed by the manufacturer, installer and contractor, agreeing to repair or replace defective doors which have been warped (bow, cup or twist) or which show photographing of construction below in face veneers, or do not conform to tolerance limitations of NWMA.

1. The warranty shall also include refinishing and reinstallation which may be required due to repair or replacement of defective doors.
2. Warranty shall be in effect during the following period of time after the date of acceptance:
   a. Solid Core Interior Doors: Five (5) years.

1.4 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01 66 00, Product Storage and Handling Requirements.

B. Delivery:

1. Deliver doors and frames to site after plaster and cement are dry, and after building has reached average prevailing humidity of its locality.
2. Deliver prefinished doors in manufacturer's original containers, clearly marked with manufacturer's name, brand name, size, thickness, and identifying symbol on the covering.
3. Seal all four edges of unfinished doors when delivered to the job site.

C. Storage:

1. Stack flat on 2"x 4" lumber, laid 12" from ends and across center.
2. Under bottom door and over top of stack, provide plywood or corrugated cardboard to protect door surfaces.
3. Store doors in area where there will be not great variations in heat, dryness and humidity.

D. Do not drag doors across one another; lift doors and carry them into position.

PART 2 PRODUCTS

2.1 MATERIALS AND COMPONENTS

A. General: Provide wood doors complying with the applicable requirements of NWMA I.S.1 for the kinds and types of doors indicated and as further specified.

B. Face panels: Manufacturer's standard 2 or 3 ply face panels, unless otherwise indicated. Wood type to be PAINT GRADE, BIRCH or equal.

C. Exposed surfaces: Provide the kind shown or scheduled and as further specified, provide same exposed surface material on both faces of each door, unless otherwise indicated.

D. Fire-Rated doors: Provide exposed faces and edges to match non-fire-rated doors in the same area of the building, unless otherwise indicated. Provide trim for openings (if any) which have been tested and listed for the kind of door and rating indicated.

2.2 SOLID CORE WOOD DOORS

A. Type II water-resistant bond.

B. Core construction: Solid wood block, wood particleboard, or mineral with wood lock blocks, as required by door manufacturer to comply with specified warranty period.

C. Face panels: Manufacturer's standard 2 or 3 ply face panels.

E. Acceptable Manufacturers:

1. Algoma Hardwoods, Inc.
2. Eggers Industries
3. Mohawk Flush Doors
4. Weyerhauser

5. Benton
6. Jeld-Wen
7. Trimlite
8. Substitutes: Section 01 33 00 – Submittal Procedures.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory condition are corrected.

3.2 INSTALLATION

A. Fitting and machining:

1. Unless doors are completely fitted and machine at the mill, fit them for width by planing and fit them for height by sawing:
   a. Bottom: 1/2" clearance maximum
   b. Top: 1/2" clearance maximum
   c. Lock edge and hinge edge: Bevel 1/8" in 2" maximum
2. Machine doors for hardware in accordance with recommendations of the hardware manufacturers, as those recommendations have been approved by the Architect.

B. Receive and retain custody of finish hardware furnished for the work of this Section under Section 08710 of these Specifications and, except as otherwise directed by the Architect, install all such finish hardware in strict accordance with the recommendations of its manufacturer.

C. Replace or re-hang doors which are hingebound and do not swing or operate freely.

D. See painting section of these specifications for requirements for finishing wood doors.

END OF SECTION

SECTION 08 41 13

ALUMINUM FRAMED ENTRANCES and STOREFRONTS

PART 1 GENERAL

1.1 DESCRIPTION

A. Work of this Section includes flush aluminum storefront system, windows, transoms, sidelites and all miscellaneous items required for a complete installation.

B. Contractor shall familiarize himself with various locations and types of materials shown, scheduled and detailed.

C. Related work:

1. Following items of related work are specified in other sections of this Specifications:
   a. Section 08 80 00 Glass and Glazing
   b. Section 07 84 00 Caulking and Sealants
   c. Section 08 71 00 Finish Hardware
   d. Section 07 60 00 Flashing and Sheet Metal

1.2 SUBMITTALS

A. Comply with pertinent provisions of Section 01 33 00, Submittal Procedures for submittal and substitutions.

B. Submit Shop Drawings for approval in accordance with the General Conditions. Include elevations of storefront systems, sash systems, details and methods of anchorage to openings, details for construction, finishes, methods for assembling section, location and installation of hardware, size, shape and thickness of materials, joints and connections and details of joining with other work.

C. Submit samples of finish to Architect for approval. Samples shall show extremes from light to dark with allowable commercial tolerances.

1.3 QUALITY ASSURANCE

A. For purpose of designating type and quality of work under this Section specifications are based on products manufactured by Kawneer Company, Inc., TubeLite, Vistawall or YKKAP.

1.4 INSPECTION OF SURFACES

A. Inspect substrates to which work adjoins. Contractor responsible for field checking all dimensions, elevations and slopes on connecting work affecting work of this Section to insure proper fit and weather-tight construction.

B. Insure all flashing is installed as required prior to storefront installation. Refer to Drawings for details concerning required sub-sill flashing with integral end dams.

1.5 GUARANTEES

A. Furnish to the Owner, through Architect, two year guarantee on all materials furnished through storefront manufacturer to be free from defects due to faulty workmanship and/or materials. Defective material repaired or replaced after proper notice immediately at no cost to the Owner. Also, guarantee installation, including caulking, free from leaks for not less than five (5) years from date of final acceptance; provided, however, that such leaks and/or defects are not resulting from

abuse by Owner, damage caused by fire, tornado, hail, hurricane, act of God, war, riot or civil commotion.

PART 2 PRODUCTS

2.1 MATERIALS

A. General: As a standard quality, various components of storefront systems mentioned herein are manufactured by the Kawneer Company, Inc. Alternate manufacturers/products are TubeLite "Versa Therm" and YKK "YES 20" and Vistawall, with thermal break.

B. Finish: Exposed surfaces of all aluminum members to be anodized, AAMA, color to be selected by Architect from manufacturer's standard finishes.

C. Metal: Aluminum extrusions shall conform to ASTM B 221-73, Type 6063-T5 Aluminum alloy. Major portions of sections .125" minimum thickness. Moldings, trim, stops .050" thickness.

D. Sub-sills: Aluminum sub-sills with integral flashing end dams shall be provided at all sill locations.

2.2 ALUMINUM ENTRANCES, STOREFRONT, OR CURTAINWALL

A. Exterior aluminum storefront located as per the Drawings at exterior window openings shall be equal to:

1. BASE BID: Kawneer series TRIFAB 451 T (thermal break) Framing System, 2" x 4-1/2", to receive 1" glazing, meeting all specifications of the above, including frames, mullions and transom bars, construction of tubular aluminum, with finish as indicated above. Air infiltration per ASTM E 283: 0.06 cfm at 6.24 psf (50 mph wind): water penetration as static pressure per ASTM E 331: 8 to 12 psf.

2. ADDITIVE ALTERNATE: Kawneer series 1620 aluminum curtain wall 2" x 6", to receive 1" glazing, meeting all specifications of the above, including frames, mullions and transom bars, construction of tubular aluminum, with finish as indicated above. Air infiltration per ASTM E 283: 0.06 cfm at 6.24 psf (50 mph wind): water penetration as static pressure per ASTM E 331: 8 to 12 psf.

B. Aluminum storefront entrance doors to be equal to Kawneer Standard Entrance 350 medium stile with 12" high bottom rail and 6" high cross rail. Single acting, size as indicated. Provide beveled or square glass stops for 1/4" infill.

All hardware, except keying, to be provided by entrance door supplier. Hardware to include top offset pivot, standard intermediate pivot, bottom offset pivot, Dor-O-Matic/Falcon 1690 touch bar with concealed rod exit device, style CO-9 pull, 4" low profile threshold with door sweep and weatherstripping.

C. Aluminum storefront located at interior windows shall be equal to Kawneer Trifab 400 framing system, 1 3/4" x 4" to receive 1/4" glazing .

D. If curtain wall option is used, arch top window shall be included in overall window unit see Alternates.

PART 3 EXECUTION

3.1 PROTECTION FROM DISSIMILAR MATERIALS

A. Protect aluminum surfaces that will abut masonry, concrete, wood or steel from contact with neoprene gaskets, or bituminous paint to prevent galvanic or corrosive action. Protect as recommended by manufacturer.

3.2 GLAZING

A. Glass and glazing are specified in Section 08 80 00. Storefront manufacturer shall furnish all glazing accessories required for complete installation of aluminum frames, transoms, window frames and sidelights.

3.3 CAULKING

A. Caulking and sealants are specified in Section 07 92 00. Completely caulk perimeter of doors and frames.

3.4 INSTALLATION

A. Install framing members in accordance with manufacturer's approved Shop Drawings in prepared openings. Members level, square, plumb and at proper elevations and in alignment with other work. All joints between exterior storefront metal and opening substrates tightly sealed in order to secure watertight job. All materials accurately cut and fitted and rigidly secured in place. All cuts and machined ends and recesses true, accurate and free of burrs or rough edges.

B. Handle doors in accordance with manufacturer's approved Shop Drawings and coordinate all work involved in such. Make final adjustments to provide easy operation and opening.

3.5 CLEANING AND PROTECTION

A. After installation, clean doors and frames following procedure recommended by manufacturer. Protect doors and frames from damage during subsequent construction activities. Replace damaged materials at no additional cost to the Owner.

3.6 OWNER'S INSTRUCTIONS

A. Give Owner's representative written and verbal instructions as to procedure required for keeping work furnished herein maintained and adjusted. Adjusting wrenches and small tools furnished with operating hardware turned over to Owner, properly tagged and identified. Foregoing shall not relieve Contractor any responsibilities under guaranty specified herein before.

END OF SECTION

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes commercial door hardware for the following:

1. Swinging doors.
2. Sliding doors.
3. Other doors to the extent indicated.

B. Door hardware includes, but is not necessarily limited to, the following:

1. Mechanical door hardware.
2. Electromechanical door hardware.
3. Cylinders specified for doors in other sections.

C. Related Sections:

1. Division 01 Section "General Conditions”.
2. Division 06 Section “Rough Carpentry”.
3. Division 06 Section “Finish Carpentry”.
4. Division 08 Section “Operations and Maintenance”.
5. Division 08 Section “Hollow Metal Doors and Frames”.
6. Division 08 Section “Flush Wood Doors”.
7. Division 08 Section “Aluminum-Framed Entrances and Storefronts”.
8. Division 26 Section "Electrical”

D. Codes and References: Comply with the version adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ICC/IBC - International Building Code.
3. NFPA 70 - National Electrical Code.
4. NFPA 80 - Fire Doors and Windows.
5. NFPA 101 - Life Safety Code.
6. NFPA 105 - Installation of Smoke Door Assemblies.
7. State Building Codes, Local Amendments.

E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:

1. ANSI/BHMA Certified Product Standards - A156 Series.
2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
3. ANSI/UL 294 - Access Control System Units.
4. UL 305 - Panic Hardware.
5. ANSI/UL 437- Key Locks.

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing, fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
3. Content: Include the following information:

    a. Type, style, function, size, label, hand, and finish of each door hardware item.
    b. Manufacturer of each item.
    c. Fastenings and other pertinent information.
    d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    e. Explanation of abbreviations, symbols, and codes contained in schedule.
    f. Mounting locations for door hardware.
    g. Door and frame sizes and materials.
    h. Warranty information for each product.

4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Shop Drawings: Details of electrified access control hardware indicating the following:

1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:

    a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
    b. Complete (risers, point-to-point) access control system block wiring diagrams.
    c. Wiring instructions for each electronic component scheduled herein.

2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.

D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

E. Informational Submittals:

1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

1.4 CLOSEOUT SUBMITTALS

A. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

B. Project Record Documents: Provide record documentation of as-built door hardware sets in digital format (.pdf, .docx, .xlsx, .csv) and as required in Division 01, Project Record Documents.

1.5 QUALITY ASSURANCE

A. Hardware Supplier and Hardware Installer must obtain a license with the Louisiana Office of State Fire Marshall in accordance to RS 40:1464 and RS 40:1664.

B. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

C. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).

D. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware 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.

E. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity.

F. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.

G. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.

H. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

1. Function of building, purpose of each area and degree of security required.
2. Plans for existing and future key system expansion.
3. Requirements for key control storage and software.
4. Installation of permanent keys, cylinder cores and software.
5. Address and requirements for delivery of keys.

I. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
3. Review sequence of operation narratives for each unique access controlled opening.
4. Review and finalize construction schedule and verify availability of materials.
5. Review the required inspecting, testing, commissioning, and demonstration procedures

J. At completion of installation, provide written documentation that components were applied according to manufacturer's instructions and recommendations and according to approved schedule.

1.6 DELIVERY, STORAGE AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.7 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.8 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4. Electrical component defects and failures within the systems operation.

C. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 BUTT HINGES

A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

1. Quantity: Provide the following hinge quantity:

   a. Two Hinges: For doors with heights up to 60 inches.
   b. Three Hinges: For doors with heights 61 to 90 inches.
   c. Four Hinges: For doors with heights 91 to 120 inches.
   d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:

   a. Widths up to 3’0”: 4-1/2” standard or heavy weight as specified.
   b. Sizes from 3’1” to 4’0”: 5” standard or heavy weight as specified.

3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

   a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
   b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4. Hinge Options: Comply with the following:

   a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for all out-swinging lockable doors.
   b. Provide single acting spring hinges of the type and style as specified.
   c. Provide double acting spring hinges of the type and style as specified.

5. Manufacturers:

   a. Hager Companies (HA) - BB Series, 5-knuckle.
   b. Ives (IV) - 5BB Series, 5-knuckle.
   c. McKinney (MK) - TA/T4A Series, 5-knuckle.

2.2 CONTINUOUS HINGES

A. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 continuous geared hinge. with minimum 0.120-inch thick extruded 6063-T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.

1. Manufacturers:.

    a. Hager Companies (HA).
    b. Ives (IV).
    c. Pemko (PE).

2.3 POWER TRANSFER DEVICES

A. Electrified Quick Connect Continuous Geared Transfer Hinges: Provide electrified transfer continuous geared hinges with a removable service panel cutout accessible without de-mounting door from the frame. Furnish with Molex™ standardized plug connectors with sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.

    1. Manufacturers:

        a. Ives (IV) - Connect.
        b. Pemko (PE) - SER-QC (# wires) Option.

B. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

    1. Provide one each of the following tools as part of the base bid contract:

        a. McKinney (MK) - Electrical Connecting Kit: QC-R001.
        b. McKinney (MK) - Connector Hand Tool: QC-R003.

    2. Manufacturers:

        a. Hager Companies (HA) - Quick Connect.
        b. McKinney (MK) - QC-C Series.
        c. Schlage (SC) - Connect.

2.4 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: Provide products conforming to ANSI/BHMA A156.3 and A156.16, Grade 1.

    1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
    2. Furnish dust proof strikes for bottom bolts.

3. Surface bolts to be minimum 8” in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
5. Manufacturers:

    a. Ives (IV).
    b. Rockwood (RO).

B. Coordinators: ANSI/BHMA A156.3 door coordinators consisting of active-leaf, hold-open lever and inactive-leaf release trigger. Model as indicated in hardware sets.

1. Manufacturers:

    a. Ives (IV).
    b. Rockwood (RO).

C. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.

1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
4. Pulls shall be provided with a 10” clearance from the finished floor on the push side to accommodate wheelchair accessibility.
5. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets. When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.
6. Manufacturers:

    a. Ives (IV).
    b. Rockwood (RO).

2.5 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:

1. Threaded mortise cylinders with rings and cams to suit hardware application.
2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.

3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
4. Tubular deadlocks and other auxiliary locks.
5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
6. Keyway: Match Facility Standard.

C. Keying System: Each type of lock and cylinders to be factory keyed.

1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. **Existing System: Field verify and key cylinders to match Owner's existing system.**

D. Key Quantity: Provide the following minimum number of keys:

1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Level/Group): Five (5).

E. Key Registration List (Bitting List):

1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

2.6 KEY CONTROL

A. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 150% of the number of locks required for the project.

1. Manufacturers:

a. Lund Equipment (LU).
b. MMF Industries (MM).
c. Telkee (TK).

2.7 CYLINDRICAL LOCKS AND LATCHING DEVICES

A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Operational Grade 1 Certified Products Directory (CPD) listed cylindrical locksets. Listed manufacturers shall meet all functions and features as specified herein.

1. Manufacturers:

a. ASSA ABLOY ACCENTRA (YA) - 5400LN Series.
b. Corbin Russwin Hardware (RU) - CLX3300 Series.
c. Sargent Manufacturing (SA) - 10X Line.

d. Schlage (SC) - ND Series.

2.8 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.
2. Strikes for Bored Locks and Latches: BHMA A156.2.
3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

2.9 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:

1. Exit devices shall have a five-year warranty.
2. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
3. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer’s catalog and template book for specific requirements.
4. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
5. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.

    a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.

b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.

7. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
9. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
10. Rail Sizing: Provide exit device rails factory sized for proper door width application.
11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed exit devices. Listed manufacturers shall meet all functions and features as specified herein.

1. Electromechanical exit devices shall have the following functions and features:

a. Universal Molex plug-in connectors that have standardized color-coded wiring and are field configurable in fail safe or fail secure and operate from 12vdc to 24vdc regulated.
b. EcoFlex or equivalent technology that reduces energy consumption up to 92% as certified by GreenCircle.
c. Options to be available for request-to-exit or enter signaling, latchbolt and touchbar monitoring.
d. Field configurable electrified trim to fail-safe or fail-secure that operates from 12-24VDC.
e. Five-year limited warranty for electromechanical features.

2. Manufacturers:

a. ASSA ABLOY ACCENTRA (YA) - 7000 Series.
b. Corbin Russwin Hardware (RU) - ED4000 / ED5000 Series.
c. Sargent Manufacturing (SA) - 80 Series.
d. Von Duprin (VD) - 35A/98 XP Series.

2.10 SURFACE DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use.

Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.

4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.

1. Heavy duty surface mounted door closers shall have a 30-year warranty.

2. Manufacturers:

a. ASSA ABLOY ACCENTRA (YA) - 4400 Series.
b. Corbin Russwin Hardware (RU) - DC6000 Series.
c. LCN Closers (LC) – 4040XP Series.
d. Sargent Manufacturing (SA) - 351 Series.

2.11 ARCHITECTURAL TRIM AND ACCESSORIES

A. Door, Frame and Wall Protective Trim: ANSI/BHMA A156.6, protective products as specified in the hardware sets. Door protection plates shall be not more than 2" less than door width on stop side and 1” less door width on the pull side or on stop side of pairs of doors. Listed manufacturers shall meet all functions and features as specified herein.

1. Provide protective trim with functions and features as follows:

a. Meets ADA requirements for smooth bottom door surfaces.
b. UL Classified options for use on fire-rated doors up to 3 hours.
c. Fabricated from stainless steel, brass, bronze, aluminum, or high-impact plastic.
d. Available in a variety of sizes, finishes, and profiles to suit aesthetic and functional requirements.
e. Designed to protect doors, frames, and adjacent walls from damage due to impact, abrasion, or traffic.
f. Fasteners included; adhesive-backed options available for select models.
g. Ten-year limited warranty.

2. Manufacturers:

a. Ives (IV).
b. Rockwood (RO).

2.12 DOOR STOPS AND HOLDERS

A. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.

1. Manufacturers:

a. Ives (IV).
b. Rockwood (RO).

B. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

1. Manufacturers:

a. Norton Rixson (NO).
b. Rockwood (RO).
c. Sargent Manufacturing (SA).

2.13 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.

1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.

1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NFPA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Manufacturers:

1. Pemko (PE).
2. Zero (ZE).

2.14 ELECTRONIC ACCESSORIES

A. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.

1. Manufacturers:

a. Security Door Controls (SD) - DPS Series.
b. Securitron (SU) - DPS Series.

B. Switching Power Supplies: Provide the least number of power supplies at the appropriate amperage level sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.

1. Power supplies shall meet all functions and features as specified herein.

a. UL listed dual voltage 12 or 24 VDC field selectable continuous output.
b. Tolerates brownout or overvoltage input ± 15% of nominal voltage.
c. Thermal shutdown protection with auto restart.
d. Circuit breaker protection against overcurrent and reverse battery faults.
e. Integrated battery charging circuit to prevent overvoltage on locking devices.
f. Available with a single relay fire trigger or individually triggered relayed outputs.
g. Monitoring options as specified.

2. Manufacturers:

a. Altronix (AS) - Maximal 3.
b. Securitron (SU) - AQD Series.

2.15 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.16 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."

4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

D. Push Plates and Door Pulls: When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.

E. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

F. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection (Punch Report): Reference Division 01 Sections “Closeout Procedures”. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.

1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

1. Quantities listed are for each pair of doors, or for each single door.
2. The supplier is responsible for handing and sizing all products.
3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

B. Manufacturer’s Abbreviations:

1. MK - McKinney
2. PE - Pemko
3. RO - Rockwood
4. YA - ASSA ABLOY ACCENTRA
5. RF - Rixson
6. OT - Other
7. SU - Securitron

Hardware Sets based on plans dated 04/2026
***Keying to be field verified prior to purchase of hardware.**

Set: 1.0
Doors: 100 A, 102 A, 125 B
Description: Exterior Alum - Access Control

1	Continuous Hinge	CFM__SLF-HD1 SER		PE	
1	MELR Rim Exit SPAR#04124	7255 B MELR 121NL - Match keying	630	YA	
1	Offset Door Pull	BF157	US32D	RO	

1	Closer w/ Stop Arm	4420 SNB	689	YA	
1	Drop Plate	488	689	YA	
1	Rain Guard	346C		PE	
1	Sweep w/ Drip	3452AV		PE	
1	Lip Threshold	2005AT		PE	
1	Perimeter Seal	By door mfgr		OT	
1	Elec Cables - Hinge to Above	QC-C1500P		MK	
1	ElectroLynx Harness	QC-C***P		MK	
1	Position Switch	DPS-M-BK		SU	
1	Power Supply	AQD Series		SU	
1	Card Reader	By Security Contractor.		OT	

Notes: Doors are normally closed and secure. Presentation of valid credential will allow entry by pull. Upon loss of power, doors will remain secure. Free egress at all times.

Set: 2.0
Doors: 211
Description: Exterior Sgl Exit - Access Control

1	Continuous Hinge	CFM__HD1 SER*		PE	
1	Rim Exit Device, Nightlatch	7155 B MELR 121NL - Match keying	630	YA	
1	Door Pull	BF157	10BE	RO	
1	Closer w/ Stop Arm	4420 SNB	689	YA	
1	Rain Guard	346D		PE	
1	Gasketing	2891DPK		PE	
1	Sweep	3452DV		PE	
1	Threshold	2005DT		PE	
1	Elec Cables - Hinge to Above	QC-C1500P		MK	
1	ElectroLynx Harness	QC-C***P		MK	
1	Card Reader	By Security		OT	
1	Power Supply	AQD Series		SU	

Notes: Doors are normally closed and secure. Presentation of valid credential will allow entry by pull. Upon loss of power, doors will remain secure. Free egress at all times.

Set: 3.0
Doors: 200
Description: Pair- Lab Unequal - Closer - Floor Stop

2	Hinge, Spring	1502	US26D	MK
4	Hinge, Full Mortise, Hvy Wt	T4A3786	US26D	MK
1	Dust Proof Strike	570	US26D	RO
1	Automatic Flush Bolts	2842 /2942	US26D	RO
1	Classroom Lock	PB 5408LN - Match keying	626	YA
1	Coordinator	2672	US28	RO
2	Mounting Bracket	2601AB	US28	RO

1	Closer	4400 SNB	689	YA
2	Kickplate	K1050 12" x 2" LDW 4BE CSK	US32D	RO
2	Door Stop	480	US32D	RO
2	Silencer	608-RKW		RO

Notes: Provide overhead stop where required by equipment or wall conditions.
Closer on active leaf.
2 ea spring hinges on inactive leaf.

Set: 4.0
Doors: 108, 122, 123, 128, 201, 202
Description: Storeroom - Closer/stop - gasket

3	Hinge, Full Mortise	TA2714	US26D	MK
1	Storeroom or Closet Lock	PB 5405LN - Match keying	626	YA
1	Closer w/ Stop Arm	4420 SNB	689	YA
1	Kickplate	K1050 12" x 2" LDW 4BE CSK	US32D	RO
1	Gasketing	S88BL		PE

Set: 5.0
Doors: 109 A, 109 B, 205
Description: Storeroom - Closer - gasket

3	Hinge, Full Mortise	TA2714	US26D	MK
1	Storeroom or Closet Lock	PB 5405LN - Match keying	626	YA
1	Closer	4400 SNB	689	YA
1	Kickplate	K1050 12" x 2" LDW 4BE CSK	US32D	RO
1	Door Stop	480	US32D	RO
1	Perimeter Seal	S773BL		PE

Set: 6.0
Doors: 107
Description: Storage - OH Stop

3	Hinge, Full Mortise	TA2714	US26D	MK
1	Storeroom or Closet Lock	PB 5405LN - Match keying	626	YA
1	Surface Overhead Stop	9-X36	630	RF
3	Silencer	608-RKW		RO

Set: 7.0
Doors: 111
Description: Int Sgl Classroom Exit

3	Hinge, Full Mortise, Hvy Wt	T4A3786	US26D	MK
1	Rim Exit Device, Classroom	7105 CR626F - Match keying	630	YA
1	Closer w/ Stop Arm	4420 SNB	689	YA
1	Kickplate	K1050 12" x 2" LDW 4BE CSK	US32D	RO
3	Silencer	608-RKW		RO

Set: 8.0
Doors: 125 A
Description: Int Sgl Rated Classroom Exit

3	Hinge, Full Mortise, Hvy Wt	T4A3786	US26D	MK
1	Fire Rated Rim Exit, Classroom	7100F CR626F - Match keying	630	YA
1	Closer w/ Stop Arm	4420 SNB	689	YA
1	Kickplate	K1050 12" x 2" LDW 4BE CSK	US32D	RO
1	Gasketing	S88BL		PE

Set: 9.0
Doors: 100 B, 102 B, 105
Description: Classroom Function - Closer - Gasket

3	Hinge, Full Mortise	TA2714	US26D	MK
1	Classroom Lock	PB 5408LN - Match keying	626	YA
1	Closer	4400 SNB	689	YA
1	Kickplate	K1050 12" x 2" LDW 4BE CSK	US32D	RO
1	Door Stop	480	US32D	RO
1	Perimeter Seal	S773BL		PE

Set: 10.0
Doors: 127 B
Description: Classroom Function - Closer

3	Hinge, Full Mortise	TA2714	US26D	MK
1	Classroom Lock	PB 5408LN - Match keying	626	YA
1	Closer	4400 SNB	689	YA
1	Kickplate	K1050 12" x 2" LDW 4BE CSK	US32D	RO
1	Door Stop	480	US32D	RO
3	Silencer	608-RKW		RO

Set: 11.0
Doors: 208
Description: Passage Function - Closer/stop - Gasket - Stair

3	Hinge, Full Mortise, Hvy Wt	T4A3786	US26D	MK
1	Passage Latch	CRCN 8801FL	626	YA
1	Closer w/ Stop Arm	4420 SNB	689	YA
1	Kickplate	K1050 12" x 2" LDW 4BE CSK	US32D	RO
1	Gasketing	S88BL		PE

Set: 12.0
Doors: 213
Description: Pair - Push Pull

6	Hinge, Full Mortise, Hvy Wt	T4A3786	US26D	MK
2	Push Plate	70E	US32D	RO
2	Pull Plate	107x70C	US32D	RO

2	Closer	4400 SNB	689	YA
2	Kickplate	K1050 12" x 2" LDW 4BE CSK	US32D	RO
2	Door Stop	480	US32D	RO
2	Silencer	608-RKW		RO

Set: 13.0
Doors: 101, 103, 110, 112, 113, 114, 116, 117, 118, 119, 120 A, 120 B, 121 A, 121 B, 126 A, 126 B, 127 A, 129, 130, 131, 203, 204, 206, 207, 209, 210, 212 A, 212 B, 214
Description: Existing

1	All hardware	Existing to remain	OT

END OF SECTION 087100

SECTION 08 80 00

GLAZING

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: Provide glazing and glazing accessories where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. In addition to complying with pertinent codes and regulations of governmental agencies having jurisdiction, comply with pertinent recommendations contained in:

1. Flat Glass Marketing Association:
   a. "Glazing Sealing Systems Manual"
   b. "Glazing Manual"

C. Glazing products by Pittsburgh Plate Glass Company and Oldcastle are acceptable. Any substitutions must be prior approved as outlined elsewhere in this Project Manual. Conform to DD-G-451 and to CPSA types, qualities and thicknesses indicated and specified.

1.3 SUBMITTALS

A. Comply with pertinent provisions of Section 01 33 00, Submittal Procedures for submittals and substitutions.

B. Product data: Within 60 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

1. Materials list of items proposed to be provided under this Section;
2. Manufacturer's specifications and other data needed to provide compliance with the specified requirements.
3. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

C. Samples: Accompanying the above product data, submit:

1. Samples of each type of glass and glazing compound proposed to be used;
2. Samples, at least 12" long, of each type of sealant proposed to be used, installed between samples of the material to be glazed, fully cured.

1.4 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01 66 00, Product Storage and Handling Requirements.

B. During storage and handling of glass, provide cushions at edges to prevent impact damage.

PART 2 PRODUCTS

2.1 GLASS

A. General:

1. For all glass, provide the type and thickness shown on the Drawings or specified herein.
2. Where type or thickness, or both, are not shown on the Drawings or specified herein, provide type and thickness directed by the Architect.

B. Labels:

1. Each piece of glass shall bear manufacturer's label showing strength, grade, thickness, type and quality. Labels must remain until glass has been set and inspected. When glass is not cut to size by manufacturer and is furnished unlabeled from local stock, submit affidavit stating quality, thickness, type and manufacturer of glass furnished.

2.2 TYPES

Type 1- 1" Tinted Plate Insulated, Low E – equal to
   a. PPG Singate 400 Low E with Solargray + clear, shading coefficient of 0.44 and SHGC of 0.25, or
   b. Guardian Glass SNX 60+

Type 2- 1" Tinted Safety Insulated, Low E

Type 3- 1" Tinted Insulated Spandrel, Low E

Type 4- 1/4" Clear Plate Glass

Type 5- 1/4" Clear Safety Glass

Type 6- ¼" Tinted Plate Glass

Type 7- ¼" fire-rated glazing in fire-rated frame

Type 8- 1" insulated clear glass, Low E, with applied translucent film on interior

2.3 GLAZING COMPOUND

A. Glass installed in glazing compound of type recommended for setting required. Compound of consistency to remain in perfect condition for minimum of two years.

1. Compound product of recognized manufacturer, formulated from selected processed oils and pigments shall be non-hardening and of type which does not require painting. Color selected by Architect from standard colors. Comply with FS TT-G-401.

2.4 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

B. Clean glazing channels, stops and rabbets to receive the glazing materials, making free from obstructions and deleterious substances which might impair the work.
   1. Remove protective coatings which might fail in adhesion or interface with bonds of sealants.
   2. Comply with manufacturer's instructions for final wiping of surfaces immediately prior to application of primer and glazing compounds or tapes.
   3. Prime surfaces to receive glazing compounds in accordance with manufacturer's recommendations.

3.2 INSTALLATION

A. Inspect each piece of glass immediately prior to start of installation.
   1. Do not install items which are improperly sized, have damaged edges, or are scratched, abraded, or damaged in any other manner.
   2. Do not remove labels from glass until so directed by the Architect.
   3. Install glass so distortion waves, if present, run in the horizontal direction.

B. Locate setting locks at sills one quarter of the width of the glass in from each end of the glass, unless otherwise recommended by the glass manufacturer.
   1. Use blocks of proper size to support the glass in accordance with the manufacturer's recommendations.
   2. Provide spacers for all glass sizes larger than 50 united inches, to separate glass from stops; except where continuous glazing gaskets or felts are provided.
      a. Locate spacers no more than 24" apart, and no closer than 12" to a corner.
      b. Place spacers opposite one another.
      c. Make bite of spacer on glass 1/4" or more.

C. Set glass in a manner which produces the greatest possible degree of uniformity in appearance.

D. Do not use two different glazing materials in the same joint system unless the joint use is approved in advance by the Architect.

E. Mask, or otherwise protect, surfaces adjacent to installation of sealants.

F. Miter-cut and seal the joints of glazing gaskets in accordance with the manufacturer's recommendations, to provide watertight and airtight seal at corners and other locations where joints are required.

3.3 PROTECTION

A. Protect glass from breakage after installation by promptly installing streamers or ribbons, suitably attached to the framing and held free from glass. Do not apply warning markings, streamers, ribbons or other items directly to the glass except as specifically directed by the Architect.

END OF SECTION

DIVISION NINE
FINISHES

CONTENTS

09 29 00	Gypsum Board
09 51 00	Suspended Acoustic Ceiling
09 65 00	Resilient Flooring
09 68 00	Carpeting
09 90 00	Painting and Coating

SECTION 09 29 00

GYPSUM BOARD

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: Provide gypsum drywall and accessories where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions and Sections in Division 01 of these Specifications.
   2. Section 06 10 00 Rough Carpentry

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 SUBMITTALS

A. Comply with pertinent provisions of Section 01 33 00, Submittal Procedures for submittals and substitutions.

B. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
   1. Materials list of items proposed to be provided under this Section;
   2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;
   3. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

1.4 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01 66 00, Product Storage and Handling Requirements.

PART 2 PRODUCTS

2.1 GYPSUM WALLBOARD

A. General:
   1. Provide gypsum wallboard complying with Fed. Spec. SS-L-30D, in 48" widths and in such lengths as will result in a minimum of joints.

B. Types:
   1. Provide regular 5/8" gypsum wallboard, tapered edges, as indicated on the Drawings except as noted.

2. Fire-Rated Gypsum Wallboard: Provide 5/8" type "x" gypsum wallboard, ASTM-36. Typical at all fire-rated wall assemblies and at one-hour ceilings as called out in Drawings. One-hour ceiling as per Factory Mutual Design FC 172, 2-25-72, or as noted on Drawings.
   a. USG FIRECODE
   b. National Gypsum "Fire-Shield"
   c. Approved equal.

3. Gypsum Wallboard, water-resistant, Type WR, 5/8" thickness, tapered edge, chemically treated multi-layered face and back paper and water-resistant gypsum core, typical at all Restrooms.

4. Gypsum Wallboard Exterior: Where indicated on plans at building exterior, Georgia Pacific Dens Glass 5/8" thickness, with fiberglass reinforced facing or equal product.

2.2 METAL TRIM

A. Form from zinc-coated steel not lighter than 26 gauge, complying with Fed. Spec. QQ-S-775, Type I, Class D or E.

B. Casing beads:
   1. Provide channel-shapes with an exposed wing, and with a concealed wing not less than 7/8" wide.
   2. The exposed wing may be covered with paper cemented to the metal, but shall be suitable for joint treatment.

C. Corner beads: Provide angle shapes with wings not less than 7/8" wide and perforated for nailing and joint treatment, or with combination metal and paper wings bonded together, not less than 1-1/4" wide and suitable for joint treatment.

D. Edge beads for use at perimeter of ceilings:
   1. Provide angle shapes with wings not less than 3/4" wide.
   2. Provide concealed wing perforated for nailing, and exposed wing edge folded flat.
   3. Exposed wing may be factory finished in white color.

2.3 JOINTING SYSTEM

A. Provide a jointing system, including reinforcing tape and compound, designed as a system to be used together and as recommended for this use by the manufacturer of the gypsum wallboard approved for use on this Work.

B. Jointing compound maybe used for finishing if so recommended by its manufacturer.

2.4 FASTENING DEVICES

A. For fastening gypsum wallboard in place on metal studs and metal channels, use flat-head screws, shouldered, specially designed for use with power-driven tools, not less than 1" long, with self-tapping threads and self-drilling points.

2.5 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. General:
   1. Install the gypsum wallboard in accordance with the Drawings and with the separate boards in moderate contact but not forced into place.
   2. At internal and external corners, conceal the cut edges of the boards by the overlapping covered edges of the abutting boards.
   3. Stagger the boards so that corners of any four boards will not meet at a common point except in vertical corners.

B. Ceilings:
   1. Install the gypsum wallboard to ceilings with the long dimensions of the wallboard at eight angles to the supporting members.
   2. Wallboard may be installed with the long dimensions parallel to supporting members that are spaced 16" on center when attachment members are provided at end joints.

C. Walls:
   1. Install the gypsum wall board to studs at right angles to the furring or framing members.
   2. Make end joints, where required, over framing or furring members.

D. Attaching:
   1. Drive the specified screws with clutch-controlled power screwdrivers, spacing the screws 12" on centers at ceilings and 16" on centers at walls.
   2. Where framing members are spaced 24" apart on walls, space screws 12" on centers.
   3. Attach double layers in accordance with the pertinent codes and the manufacturer's recommendation as approved by the Architect.
   4. Attach to wood as required by governmental agencies having jurisdiction.

E. Access Doors:
   1. By careful coordination with the Drawings and with the trades involved, install the specified access doors where required.
   2. Anchor firmly into position, and align properly to achieve an installation flush with the finished surface.

3.3 JOINT TREATMENT

A. General:
   1. Inspect areas to be joint treated, verifying that the gypsum wallboard fits snugly against supporting framework.
   2. In areas where joint treatment and compound finishing will be performed, maintain a temperature of not less than 55 degrees for 24 hours prior to commencing the treatment, and until joint and finishing compounds have dried.
   3. Apply the joint treatment and finishing compound by machine or hand tool.
   4. Provide a minimum drying time of 24 hours between coats, with additional drying time in poorly ventilated areas.

B. Embedding compounds:
   1. Apply to gypsum wallboard joints and fastener heads in a thin uniform layer.
   2. Spread the compound not less than 3" wide at joints, center the reinforcing tape in the joint and embed the tape in the compound. Then spread a thin layer of compound over the tape.
   3. After this treatment has dried, apply a second coat of embedding compound to joints and fastener heads, spreading in a thin uniform coat to not less than 6" wide at joints and feather edged.
   4. Sandpaper between coats as required.
   5. When thoroughly dried dry, sandpaper to eliminate ridges and high points.

C. Finishing compounds:
   1. After embedding compound is thoroughly dry and has been completely sanded, apply a coat of finishing compound to joints and fastener heads.
   2. Feather the finishing compound to not less than 12" wide.
   3. When thoroughly dry, sandpaper to obtain a uniformly smooth surface, taking care to not scuff the paper surface of the wallboard.

3.4 CORNER TREATMENT

A. Internal corners: Treat as specified for joints, except fold the reinforcing tape lengthwise through the middle and fit neatly into the corner.

B. External corners:
   1. Install the specified corner bead, fitting neatly over the corner and securing with the same type fasteners used for installing the wallboard.
   2. Space the fasteners approximately 6" on centers, and drive through the wallboard into the framing or furring member.
   3. After the corner bead has been secured into position, treat the corner with joint compound and reinforcing tape as specified for joints, feathering the joint compound out from 8" to 10" on each side of the corner.

3.5 OTHER METAL TRIM

A. General:
   1. The Drawings do not purport to show all locations and requirements for metal trim.
   2. Carefully study the Drawings and the installation, and provide all metal trim normally recommended by the manufacturer of the gypsum wallboard approved for use in the Work.

3.6 CLEANING UP

A. In additional to other requirements for cleaning, use necessary care to prevent scattering gypsum wallboard scraps and dust, and to prevent tracking gypsum and joint finishing compound onto floor surfaces.

B. At completion of each segment of installation in a room or space, promptly pick up and remove from the working area all scrap, debris and surplus material of this Section.

END OF SECTION

SECTION 09 51 00

SUSPENDED ACOUSTICAL CEILINGS

PART 1 GENERAL

1.1 DESCRIPTION

A. Work of this Section includes acoustical tile and support systems complete.

1.2 APPLICABLE STANDARDS

A. Conform to applicable requirements of Standards:
   1. Federal Specifications (FS):
      a. SS-S-118A(3) - "Sound Controlling Blocks and Boards (Acoustical Tile and Panels, Prefabricated):
   2. American Society for Testing and Materials (ASTM):
      a. C 635 - "Metal Suspension Systems for Acoustical Tiles and Lay-in Panels"
      b. C 636 - "Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels"
      c. E 84 - "Surface Burning Characteristics for Building Materials"
   3. Acoustical Materials Association (AMA):
      a. "Sound Absorption Coefficients for Building Materials"
   4. Ceiling and Interior Systems Contractors Association (CISCA):
      a. "Installation Guide"

1.3 JOB CONDITIONS

A. Materials installed under temperature and humidity conditions closely approximating those which will exist when building is occupied. All windows and doors shall be in place and glazed. Conditions are as outlined in Job Conditions Section of current AMA Bulletin and in CISCA Installation Guide.

1.4 SAMPLES

A. Submit representative samples in duplicate of ceiling tile (12"x12") and suspension system for approval.

1.5 QUALITY ASSURANCE

A. For standard of quality, suspension systems products of Eastern, Donn Company and Chicago Metallic; acoustical tile products of Armstrong, U. S. Gypsum and Conwed Company. Both grid and ceiling panel must be from a single source/manufacturer.

1.6 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

PART 2 PRODUCTS

2.1 MATERIALS (ACT – Acoustical Ceiling Tile)

A. CEILING TILE
1. Equal to Armstrong, Fine Fissured, High NRC, 1756, 24” x 24” x 7/8”, white, angled tegular lay-in, fine texture, humidity resistant, in 15/16" exposed tee grid. CAC .40, NRC: 0.70, Class A (UL), .86 light reflectivity, with HumiGuard Plus, BioBlock+ Anti-Microbial.
2. Acceptable manufacturer: USG, #22340,.
3. Approved equals.

2.2 SUSPENSION SYSTEMS

A. Components: Main beams and cross tees, base metal and end detail, fabricated from commercial quality hot dipped galvanized steel complying with ASTM A653. Main beams and cross tees are double-web steel construction with flange type exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.
1. Structural Classification: ASTM C 635 (Duty Class) duty.
2. Color: white and match the actual color of the selected ceiling tile, unless noted otherwise.
3. Acceptable Product: As manufactured by Armstrong World Industries, Inc. Other acceptable manufacturers include Chicago Metallic, USG, or other approved equal.

B. High Humidity Finish: Comply with ASTM C 635 requirements for Coating Classification for Severe Environmental Performance where high humidity finishes are indicated:
1. Structural classification: ASTM C 635 duty class.

C. Suspension system shall be equal to:
1. Armstrong PRELUDE ML 15/16" exposed tee grid. Acceptable manufacturers include Chicago Metallic.

D. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung, unless otherwise indicated.

E. Wire for Hangers and Ties: ASTM A641, Class 1 zinc coating, soft temper, prestretched, with a yield stress load of at least three times design load, but not less than 12 gauge.

F. Edge Moldings and Trim: Metal or extruded aluminum types and profiles indicated, or if not indicated, manufacturer's standard moldings for edges and penetrations, including light fixtures, that fit type of edge detail and suspension system indicated. Provide moldings with exposed flange of the same width as exposed runner.

G. Accessories: Provide other accessories as needed for a complete and finished installation.

PART 3 EXECUTION

3.1 SPECIAL REQUIREMENTS

A. Shop and Erection Drawings: A detailed set of Shop Drawings showing complete layout of components to correlate with light fixtures and grilles will be required.

3.2 CEILING SYSTEM CONTRACTOR

A. Materials and suspension systems installed by subcontractor thoroughly experienced in fire rated installation and approved by manufacturer.

3.3 ACOUSTICAL UNITS AND SUSPENSION SYSTEMS

A. Installation and Suspension System: Furnish and install exposed grid system and direct attachment specified in strict accordance with standards and manufacturer's recommendations. Install to permit border units of greatest possible size. System level, straight and square; ceilings secure. Deflection maximum span 1/360 span. Where recessed troffer lights are used, provide grid components on both sides of lights. Lights securely supported from structural work above. Air outlets and lights occurring in ceilings center of grid where possible. Where located on main supports, support cut members and channel framing wired above ceiling.
   1. Space main beams not more than 4' on centers and 3" from parallel walls. Space wires maximum 4' each way. Secure wires to structure and wrap minimum three turns around itself at grid.
   2. Coordinate with electrical and mechanical work for required support and clearances.

3.4 CLEANING

A. Contractor shall clean or replace an soiled or discolored units. Contractor shall replace any damaged or improperly installed units.

3.5 GUARANTEE

A. Furnish Architect with regular guarantee that acoustical ceilings meet requirements of manufacturer's specifications and standards stated above.

END OF SECTION

SECTION 09 65 00

RESILIENT FLOORING

PART 1 GENERAL

1.1 DESCRIPTION

A. Work of this Section includes vinyl composition flooring and vinyl wall base for areas scheduled and detailed. No asbestos fibers allowed.

1.2 APPLICABLE STANDARDS

A. Conform to applicable portions of:

1. Asphalt and Vinyl Tile Institute Publications.
2. Federal Specifications SS-T-312B: Tile, Floor, Asphalt, Rubber, Vinyl.
3. Federal Specifications SS-W-40A: Wall Base: Rubber and Vinyl Plastic.

1.3 DELIVERY AND STORAGE

A. Deliver materials to job in original, unopened containers, with manufacturer's brand name clearly marked thereon. Handle and store materials in accordance with manufacturer's instructions. See Section 01 66 00, Product Storage and Handling Requirements.

1.4 SAMPLES

A. Submit representative samples in duplicate of vinyl composition tile (12"x12") and vinyl wall base for approval. See Section 01 33 00, Submittal Procedures.

PART 2 PRODUCTS

2.1 MATERIALS

A. All Luxury Vinyl Tile to be equal to 12' x 18', Mannington Spacia. Color and style to be selected by Architect and shall be equal to specified.

B. All Resilient Base: to be 4" cove rubber base with reclining curvature at top equal to Roppe.

PART 3 EXECUTION

3.1 PREPARATION

A. Examine surfaces to receive materials before work is started.

B. Correct defects which might interfere with laying resilient materials in proper manner.

C. Starting of work construed as acceptance of conditions under which work will be done.

D. Store materials in original packages, at temperature of not less than 70 degrees Fahrenheit for at least 24 hours prior to laying.

E. Remove grease, dirt and other deleterious substances. Substrate must be free from holes and without high or low points.

F. Schedule and hold a Pre-Installation Conference with Architect, General Contractor, Flooring Installer.

3.2 INSTALLATION - ADHESIVES

A. Mix and apply in accordance with manufacturer's instruction and recommendations.

B. Prevent soiling and staining of adjacent surfaces with adhesive.

C. Apply adhesive at rate of permit installation of flooring within working time of adhesive.

3.3 INSTALLATION - FLOORING AND BASE

A. Install flooring in accordance with manufacturer's instructions and recommendations.

B. Level floors, or run true to plane, to within 1/8" in six feet. Correct minor variations with underlayment. Lay tile with tight joints and straight lines. Cut to fit accurately at joining with other materials. Lay symmetrically about center line of room to avoid use of less than 1/2 tile where practicable. After floor has set sufficiently to become seated, wash with neutral cleaner. Apply one coat of high grade water emulsion wax and thoroughly buff. Restrict traffic unless floors are protected. Leave clean, smooth, free from buckles, cracks and projecting edges.

C. Backing for base shall be dry and clean. Install base tight to wall and floor. Cement base to wall using adhesive and method recommended by manufacturer. Form in and out angles neatly from as long lengths as possible. Scribe accurately to time at openings. Base must adhere tightly to walls. Leave in clean, unmarred condition, with all edges straight and level.

D. Do not install base until flooring is complete. Straight base installed prior to carpet installation.

END OF SECTION

SECTION 09 68 00

CARPETING

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: Provide carpeting and carpet accessories where shown on the Drawings, as specified herein, and as needed for complete and proper carpet installation.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 SUBMITTALS

A. Comply with pertinent provisions of Section 01 33 00, Submittal Procedures.

B. Product data: Within 60 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

1. Materials list of items proposed to be provided under this Section;
2. Manufacturer's specifications and other data needed to provide compliance with the specified requirements;
3. Shop Drawings showing location of seams and locations and types of carpet metal and accessories.
4. Samples of the full range of colors and patterns of carpet and exposed accessories available from the proposed manufacturers in the specified quantities.
5. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

C. After the Architect has selected the color and pattern, submit three samples of each specified color and pattern from the stock proposed to be installed. Secure the Architect's approval of these samples prior to installation.

1.4 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01 66 00, Product Storage and Handling Requirements.

PART 2 PRODUCTS

2.1 CARPET

A. Carpet Tile #1 to be equal to EF Contract, District II, 24" x 24". Color and style to be selected by Architect and shall be equal to specified.

2.2 OTHER MATERIALS

A. Provide seam adhesive such as W. W. Henry Company No. 246, Roberts Company No. 41-0502, or an equal approved by the Architect and recommended for the purpose by the manufacturer of the proposed carpet.

B. At intersection of carpet and floor tile, provide equal to Mercer Plastics Company, Inc., "Custom Edge Carpet Bar No. 90", rubber, or equal, in color selected by the Architect.

C. Concrete sealer: 35% solution of 42 deg Baume sodium silicate and non-acid penetrating agent compatible with adhesive.

D. Provide other materials, including tackless strips, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 SURFACE PREPARATION

A. Make substrate level and free from irregularities. Assure one constant floor height after carpet is installed, filling low spots and grinding high spots as required.

3.3 INSTALLATION

A. General:

1. Install in strict accordance with the manufacturer's recommendations as approved by the Architect.
2. Scribe the carpet accurately to vertical surfaces.
3. Align the lines of carpet, as woven, using no fill strips less than 6" wide, laying all carpet in the same direction unless specifically directed otherwise by the Architect.
4. Where carpeting is used on the walls, install as directed by the manufacturer, and trim the tip edge and exposed vertical edges with a brass cap approved by the Architect.

B. Seams:

1. Locate seams only where shown on the approved Shop Drawings, or where specifically otherwise approved by the Architect.
2. Locate seams to the maximum extent practicable out of the way of traffic.
3. Fabricate seams by the compression method, using a butt joint, and proper bead and seal.
4. Make seams as inconspicuous as possible, flat, unpuckered and completely free from glue on the exposed surface.
5. Do not stretch seams.

C. In addition to the cleaning requirements stated elsewhere, thoroughly clean carpet and adjacent surfaces prior to final acceptance of the carpeted areas by the Owner.

3.4 PROTECTION

A. Provide a heavy non-staining paper or plastic walkway as required over carpeting in direction of traffic, maintaining intact until carpeted space is accepted by the Owner.

3.5 SURPLUS MATERIAL

A. Allow the Owner to inspect and select from scrap carpet remaining after the installation. Bundle, wrap in burlap, and deliver to the Owner the carpet scraps selected by him.

END OF SECTION

SECTION 09 90 00

PAINTING AND COATING

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: Paint and finish the exterior and interior exposed surfaces listed on the Painting Schedule in Part 3 of this Section, as specified herein, and as needed for a complete and proper installation.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.
2. Priming or priming and finishing of certain surfaces may be specified to be factory-performed or installer-performed under pertinent other Sections.

C. Work not included:

1. Unless otherwise indicated, painting is not required on surfaces in concealed areas and inaccessible areas such as furred spaces, foundation spaces, utility tunnels, pipe spaces and duct shafts.
2. Metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not required painting under this Section except as may be so specified.
3. Do not paint moving parts of operating units; mechanical or electrical parts such as valve operators; linkages; sending devices; and motor shafts, unless otherwise indicated.
4. Do not paint over required labels or equipment identification, performance rating, name, or nomenclature plates.

D. Definitions:

1. "Paint," as used herein, means coating systems materials including primers, emulsions, epoxy, enamels, sealers, fillers and other applied materials whether used as prime, intermediate, or finish coats.

1.2 QUALITY ASSURANCE

A. Use adequate number of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Paint coordination:

1. Provide finish coats which are compatible with the prime coats actually used.
2. Review other Sections of these Specifications as required, verifying the prime coats to be used and assuring compatibility of the total coating system for the various substrata.
3. Upon request, furnish information on the characteristics of the specific finish materials to assure that compatible prime coats are used.
4. Provide barrier coats over noncompatible primers, or remove the primer and reprime as required.
5. Notify the Architect in writing of anticipated problems in using the specified coating systems over prime coatings supplied under other Sections.

1.3 SUBMITTALS

A. Comply with pertinent provisions of Section 01 33 00, Submittal Procedures.

B. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

1. Materials list of items proposed to be provided under this Section;
2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.

C. Samples:

1. Following the selection of colors and glosses by the Architect, submit samples for the Architect's review.
   a. Provide three (3) Samples of each color and each gloss for each material on which the finish is specified to be applied.
   b. Except as otherwise directed by the Architect, make Samples approximately 8'x10" in size.
   c. If so directed by the Architect, submit Samples during progress of the Work in the form of actual application of the approved materials on actual surfaces to be painted.
2. Revise and resubmit each Sample as requested until the required gloss, color and texture is achieved. Such Samples, when approved, will become standards of color and finish for accepting or rejecting the work of this Section.
3. Do not commence to finish painting until approved Samples are on file at the job site.

1.4 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01 66 00, Product Storage and Handling Requirements.

1.5 JOB CONDITIONS

A. Do not apply solvent-thinned paints when the temperature of surfaces to be painted and the surrounding air temperatures are below 45 degrees Fahrenheit, unless otherwise permitted by the manufacturer's printed instructions as approved by the Architect.

B. Weather conditions:

1. Do not apply paint in snow, rain, fog or mist; or when the relative humidity exceeds 85%; or to damp or west surfaces, unless otherwise permitted by the manufacturer's printed instructions as approved by the Architect.
2. Applications may be continued during inclement weather only within the temperature limits specified by the paint manufacturer as being suitable for use during application and drying periods.

1.6 EXTRA STOCK

A. Upon completion of the work of this Section, deliver to the Owner an extra stock equaling 10% of each color, type and gloss of paint used in the Work, tightly sealing each container, and clearly labeling with contents and locations where used.

PART 2 PRODUCTS

2.1 MATERIALS - GENERAL

A. Top grade products of well-know manufacturers, applied in strict accordance with directions and recommendation of manufacturer. Submit list of materials to be used for approval in writing.

B. Paint materials mentioned herein are used as standard of quality. Materials equal to those of Pittsburgh Plate Glass Company, Sherwin-Williams Company, Devoe & Raynolds Company, DeSoto Company, Tnemac, Rust-o-leum Corporation and Benjamin Moore Company.

C. Materials and workmanship must conform to requirements of the Occupational Safety and Health Act (OSHA).

D. Undercoats and thinners:

1. Provide undercoat paint produced by the same manufacturer as the finish coat.
2. Use only the thinners recommended by the paint manufacturer, and use only to the recommended limits.
3. Insofar as practicable, use undercoat, finish coat, and thinner material as parts of a unified system of paint finish.

2.2 COLOR SCHEDULES

A. The Architect will prepare a color schedule with samples for guidance in painting.

B. The Architect may select, allocate, and vary colors on different surfaces throughout the Work, subject to the following:

1. Exterior work: A maximum of two (2) different colors will be used.
2. Interior work: A maximum of four (4) different pigmented colors will be used.

2.3 APPLICATION EQUIPMENT

A. For application of the approved paint, use only such equipment as is recommended for application of the particular paint by the manufacturer of the particular paint and as approved by the Architect.

B. Prior to use of application equipment, verify that the proposed equipment is actually compatible with the material to be applied and that integrity of the finish will not be jeopardized by use of proposed equipment.

2.4 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 MATERIALS PREPARATION

A. General:

1. Mix and prepare paint materials in strict accordance with the manufacturer's recommendations as approved by the Architect.
2. When materials are not in use, store in tightly covered containers.
3. Maintain containers used in storage, mixing, and application of paint in a clean condition, free from foreign materials and residue.

B. Stirring:

1. Stir materials before application, producing a mixture of uniform density.
2. Do not stir into the material any film which may form on the surface, but remove the film and, if necessary strain the material before using.

3.3 SURFACE PREPARATION

A. General:

1. Perform preparation and cleaning procedures in strict accordance with the paint manufacturer's recommendations as approved by the Architect.
2. Remove removable items which are in place and are not scheduled to receive paint finish; or provide surface-applied protection prior to surface preparation and painting operations.
3. Following completion of painting in each space or area, reinstall the removed items by using workmen who are skilled in the necessary trades.
4. clean each surface to be painted prior to applying paint or surface treatment.
5. Remove oil and grease with clean cloths and cleaning solvent of low toxicity and flash paint in excess of 200 degrees Fahrenheit, prior to start of mechanical cleaning.
6. Schedule and cleaning and painting so that dust and other contaminants from the cleaning process will not fall onto wet newly painted surfaces.

B. Preparation of wood surfaces:

1. Clean wood surfaces until free from dirt, oil and other foreign substance.
2. Smooth finished wood surfaces exposed to view, using the proper sandpaper. Where so required, use varying degrees of coarseness in sandpaper to produce a uniformly smooth and unmarred wood surface.
3. Unless specifically approved by the Architect, do not proceed with painting of wood surfaces until the moisture content of the wood is 12% or less as measured by a moisture meter approved by the Architect.
4. Remove existing painting from areas indicated to fresh surface and provide smooth wood surface for painting.

C. Preparation of metal surfaces:

1. Thoroughly clean surfaces until free from dirt, oil and grease.
2. On galvanized surfaces, use solvent for the initial cleaning, and then treat the surface thoroughly with phosphoric acid etch. Remove etching solution completely before proceeding.
3. Allow to dry thoroughly before application of paint.

3.4 PAINT APPLICATION

A. General:

1. Touch-up shop applied prime coats which have been damaged, and touch-up bare areas prior to start of finish coats application.
2. Slightly vary color of succeeding coats.
   a. Do not apply additional coats until the completed coat has been inspected and approved.
   b. Only the inspected and approved coats of paint will be considered in determining the number of coats applied.
3. Sand and dust between coats to remove defects visible to the unaided eye from a distance of five feet.
4. On removable panels and hinged panels, paint the back sides to match the exposed sides.

B. Drying:

1. Allow sufficient drying time between coats, modifying the period as recommended by the material manufacturer to suit adverse weather conditions.
2. Consider oil-base and oleo-resinous solvent-type paint as dry for recoating when the paint feels firm, does not deform or feel sticky under moderate pressure of the thumb, and when the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

C. Brush applications:

1. Brush out and work the brush coats onto the surface in an even film.
2. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, and other surface imperfections will not be acceptable.

D. Spray application:

1. Except as specifically otherwise approved by the Architect, confine spray application to metal framework and similar surfaces where hand brush work would be inferior.
2. Where spray application is used, apply each coat to provide the hiding equivalent of brush coats.
3. Do not double back with spray equipment to build up film thickness of two coats in one pass.

E. For completed work, match the approved Samples as to texture, color and coverage. Remove, refinish, or repaint work not in compliance with the specified requirements.

F. Miscellaneous surfaces and procedures:

1. Exposed mechanical items:
   a. Finish electric panels, access doors, conduits, pipes, sprinkler pipes, ducts, grilles, registers, vents and items of similar nature to match the adjacent wall and ceiling surfaces, or as directed.
   b. Paint visible duct surfaces behind vents, registers and grilles flat black.
   c. Wash metal with solvent, prime and apply two coats of alkyd enamel.
2. Exposed pipe and duct installation:
   a. Apply one coat of latex paint on insulation which has been sized or primed under other Sections; apply two coats on each surface when unprepared.
   b. Match color of adjacent surfaces.
   c. Remove band before painting, and replace after painting.
3. Hardware: Paint prime coated hardware to match adjacent surfaces.
4. Wet areas:
   a. In toilet rooms and contiguous areas, add an approved fungicide to paints.
   b. For oil base paints, use 1% phenolmercuric or 4% tetrachlorophenol.
   c. For water emulsion and glue size surfaces, use 4% sodium tetrachlorophenate.
5. Interior: Use "stipple" finish where enamel is specified.
6. Exposed vents: Apply two coats of heat-resistant paint approved by the Architect.
7. 4" high exposed section of sheetrock or cmu between storefront and rubber base to be painted to match rubber base color.

3.5 PAINTING SYSTEMS

A. Exterior Steel and Iron:

1. Where rusting or mechanical damage has occured to primer or existing finish, wire brush to bare metal and prime with Moore's Ironclad Retardo Rust Inhibitive Paint.
2. Apply one coat of "Improve Gloss Enamel" to which has been added one ounce per gallon of MilDoEnd as manufactured by the Dianol Division of Mills Pearson Corporation of St. Petersburgh, Florida. Apply to film thickness of not less than 2 mils. Apply second coat to not less than same thickness as the first coat.

a. MilDoEnd shall be kept away from open flame, from children and animals. Do not take internally. Keep bottle closed when not in use. Observe all safety precautions required in handling toxic inflammables.

B. Exterior Paint Systems:

1. Existing Concrete Masonry Units:
   1st coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series
   2nd coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series
   (4 mils wet, 1.5 mils dry per coat)

2. New Concrete Masonry Units:
   1st coat: S-W Prep Rite Block Filler, B25W25 (75-125 sq. ft./ gal.)
   2nd coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series
   3rd coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series

3. Existing Plywood or Wood Surfaces:
   1st coat: Spot prime as required, S-W Exterior Latex Wood Primer B42W8041
   (4 mils wet, 1.4 mils dry per coat)

   2nd coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series
   3rd coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series
   (4 mils wet, 1.5 mils dry per coat)

4. New Plywood or Wood Surfaces:
   1st coat: S-W Exterior Latex Wood Primer B42W8041
   (4 mils wet, 1.4 mils dry per coat)
   2nd coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series
   3rd coat: S-W Metalatex Acrylic Semi-Gloss, B42 Series
   (4 mils wet, 1.5 mils dry per coat)

5. Ferrous metals:
   1st coat: Kem Bond HS Primer
   2nd coat: Pro Industrial Urethane Alkyd Enamel, B54-150 Series
   3rd coat: Pro Industrial Urethane Alkyd Enamel, B54-150 Series
   (3.5 mils wet, 2 mils dry per coat)

C. Interior Paint Systems:
1. Ferrous metals:
   1st coat: S-W Pro Industrial Pro-Cryl Primer, B66-310 Series
   2nd coat: S-W Pro Mar 200 Alkyd Semi-Gloss, B34W200 Series
   3rd coat: S-W Pro Mar 200 Alkyd Semi-Gloss, B34W200 Series
   (4 mils wet, 1.7 mils dry per coat)

2. Painted woodwork:
   1st coat: S-W Premium Wall and Wood Primer B28W8111
   (4 mils wet, 1.8 mils dry per coat)
   2nd coat: S-W Pro Mar 200 Alkyd Semi-Gloss, B34W200 Series
   3rd coat: S-W Pro Mar 200 Alkyd Semi-Gloss, B34W200 Series
   (4 mils wet, 1.7 mils dry per coat)

3. Stained woodwork:
   1st coat: S-W Wood Classics Oil Stain, A49 Series (450-500 sq. ft./ gal.)
   2nd coat: S-W Wood Classics Polyurethane Varnish, A67 Series
   3rd coat: S-W Wood Classics Polyurethane Varnish, A67 Series (350-400 sq. ft./ gal.)

4. Transparent Woodwork:
   1st coat: S-W Wood Classics Polyurethane Varnish, A67 Series

2nd coat: S-W Wood Classics Polyurethane Varnish, A67 Series (350-400 sq. ft./ gal.)

5. Gypsum Board- Epoxy Paint:
   1st coat: Interior Latex Emulsion (TT-P-650)
   2nd coat: Polyester Epoxy, Semi-Gloss Finish (FS-TT-C-545)
   3rd coat: Polyester Epoxy, Semi-Gloss Finish (FS-TT-C-545)

6. Gypsum Board- Regular Paint:
   1st coat: S-W Pro Mar 200 Zero VOC Latex Primer, B28W2600 (4 mils wet, 1.5 mils dry)
   2nd coat: S-W Pro Mar 200 Latex Eg-Shel, B20-2200 Series
   3rd coat: S-W Pro Mar 200 Latex Eg-Shel, B20-2200 Series (4 mils wet, 1.6 mils dry per coat)
   *Ceilings to have flat finish.

7. Existing Concrete Masonry Units:
   1st coat: S-W Prep Rite Block Filler, B25W25 (75-125 sq. ft./ gal.)
   2nd coat: S-W Pro Mar 200 Latex Semi-Gloss, B31-2200 Series
   (4mils wet, 1.3 mils dry per coat)

8. New Concrete Masonry Units:
   1st coat: S-W Prep Rite Block Filler, B25W25 (75-125 sq. ft./ gal.)
   2nd coat: S-W Pro Mar 200 Latex Semi-Gloss, B31-2200 Series
   3rd coat: S-W Pro Mar 200 Latex Semi-Gloss, B31-2200 Series
   (4mils wet, 1.3 mils dry per coat)

9. Gypsum Board Preparation: External angles provided with Perf-A-Trim. Per-A-Tape Cement and Perf-A-Tape Topping Cement mixed in accordance with manufacturer's recommendations. Using suitable tool or machine, thick uniform layer of Perf-A-Tape cement (embedding type), applied 3" wide applied over joint to be reinforced. Tape shall then be centered over joint and sealed into cement, leaving sufficient cement adhesive under tape to provide proper bond. Wall inside vertical corner angles shall be reinforced with reinforcing tape folded to conform to adjoining surfaces and to form a straight, true angle. Joints allowed to dry thoroughly, 24 hour minimum between each application of cement. Tape covered with topping cement, spread evenly over and slightly beyond tapered edge of board and feathered at edges. After previous coat is dry, cover with second coat of topping cement with smooth uniform slight crown over joint and edge feathered slightly beyond preceding coat. Dimples such as nail heads shall receive three coats of cement applied as each coat of cement is applied to joints. Cemented areas sanded after each application of cement has dried. Final coat of cement and subsequent sanding shall leave gypsum board and treated areas uniformly smooth and ready for painting.

10. Concrete: Solvent-Based Concrete Sealer equal to H&C® Concrete Sealer Solid Color Solvent-Based, clear. Apply 2 coats at the application rate of 200-250 sq. ft. per gallon and apply in accordance with the manufacturer's recommendations. Apply to all areas of exposed concrete floor slab at building interior.

END OF SECTION

DIVISION 10
SPECIALTIES

CONTENTS

10 14 19	Dimensional Letters and Monument Signage
10 44 00	Portable Fire Extinguishers
10 44 10	Interior Room Signs
10 73 00	Aluminum Walkway Covers
10 80 00	Specialties

SECTION 10 14 19
DIMENSIONAL LETTER AND MONUMENT SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Dimensional letter signage.

B. Exterior custom fabricated dimensional letters with integrated perimeter face illumination and interior perforated aluminum panel detail.

C. Exterior freestanding monument signs with internal illumination

1.02 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

D. UL 879 - Electric Sign Components; Current Edition, Including All Revisions.

1.03 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's product literature for each type of dimensional letter sign, indicating style, font, colors, locations, and overall dimensions of each sign.

C. Shop Drawings:

1. Include dimensions, locations, elevations, materials, text and graphic layout, and attachment details.
2. Show locations of electrical service connections.

D. Verification Samples: Submit samples showing colors and finishes specified.

E. Manufacturer's Installation Instructions: Include installation templates and attachment devices.

F. Closeout Submittals:

1. Submit operation and maintenance data for installed products, including precautions against harmful cleaning materials and methods.
2. Submit warranty documents specified herein.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience in fabrication and installation of custom illuminated signage of similar scope and complexity.

B. Single Source Responsibility: Obtain all exterior signage products through one qualified signage manufacturer who shall both fabricate and install all signage specified herein. Signage brokers or subcontract-only installers are not acceptable

C. Installation Qualification: Installation shall be performed by manufacturer’s own installation personnel, experienced in work similar to that required for this project.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

B. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Package dimensional letter signs as required to prevent damage before installation.

D. Store under cover and elevated above grade.

E. Store tape adhesive at a normal room temperature of 68 to 72 degrees F.

1.06 FIELD CONDITIONS

A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.

B. Maintain minimum ambient temperature during and after installation.

1.07 WARRANTY

A. Project Warranty: Comply with requirements of Division 1.

B. Manufacturer's Warranty: Submit manufacturer's standard warranty document executed by authorized company official.

1. Warranty Period: One year from date of substantial completion. Warranty specifically excludes letter mounting substrate.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Dimensional Custom Fabricated Letter, and Freestanding Monumnent Signs:

1. ASI Signage Innovations: www.asisignage.com
2. Takeform: www.takeform.net.
3. Gemini: www.geminimade.com.
4. Gibko Signs; www.gibkocom.wordpress.com
5. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 CUSTOM FABRICATED LETTERS

A. Construction:

1. Custom fabricated aluminum letter with integrated perimeter illumination through face
2. Interior panel: perforated aluminum selection, pattern to be selected by Architect.
3. Returns: minimum 0.080-inch aluminum.
4. Faces and backs: minimum 0.125-inch aluminum
5. Interior perimeter trim at perforated panel.
6. All seams continuously welded, ground smooth, free of visible joints

B. Finish:

1. Polyurethane paint system, custom color per client branding.
2. Finish to meet or exceed AAMA 2604 performance.

C. Illumination:

1. Perimeter face-illuminated with UL-listed LED modules.
2. LED Color: White, 6500K (±300K).
3. Even light distribution without hotspots.
4. UL 48 compliance required.

D. Mounting:

1. Concealed angle bracket system behind letter, mechanically fastened to steel angle at vertical tube supports.
2. Mounting concealed by interior perforated panel.
3. All hardware stainless steel, concealed wherever possible

2.03 FREESTANDING MONUMENT SIGNS

A. Construction:

1. Custom fabricated aluminum cabinet with integrated internal illumination
2. 1/8” thick aluminum faces with internal welded framework consisting of 1/8” thick wall aluminum tube frame
3. All seams continuously welded, ground smooth, free of visible joints
4. Post supports as indicated on the drawings. Match finish of cabinet.
5. Refer to drawings for size and quantity

B. Finish:

1. Polyurethane paint system, custom color per client branding.
2. Finish to meet or exceed AAMA 2604 performance.

C. Graphics/Illumination:
1. 3/8” proud push-thru acrylic letters to be illuminated with UL-listed LED modules.
2. LED Color: White, 6500K (±300K).
3. Even light distribution without hotspots
4. UL 48 compliance required.

D. Mounting:
1. Post mounted in concrete footing as required by signage manufacturer
2. Screws in face of sign to access interior of sign. Screws painted to match face.
3. Concrete footing above grade as required by signage manufacturer.

2.04 DIMENSIONAL LETTERS

A. Applications: Donor Signage and other special letter requirements identified on drawings.
1. Use individual metal letters.
2. Mounting Location: Interior as indicated on drawings.
3. Allow for total of 25 letters, 8 inches high.

B. Metal Letters:
1. Material: Aluminum sheet, flat.
2. Thickness: Manufacturer's standard for letter size.
3. Letter Height: 12 inches.
4. Text and Typeface:
a. Character Font: to match typical panel signage font.
5. Finish: As selected by Architect from manufacturer's full range.
6. Color: As selected.
7. Mounting: Concealed screws.

2.05 FABRICATION : GENERAL

A. General: Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction

B. Design, fabricate, and install sign assemblies to prevent buckling, opening up of joints, and over-stressing of welds and fasteners

C. Mill joints to a tight, hairline fit. Form joints exposed to the weather to exclude water penetration

D. Conceal fasteners if possible; otherwise, locate fasteners where they will be inconspicuous.

E. Create signage to required sizes and layout. Comply with requirements indicated for design, dimensions, finish, color, and details of construction.

2.06 ACCESSORIES

A. Concealed Screws: Noncorroding metal; stainless steel, galvanized steel, chrome plated, or other.

B. Tape Adhesive: Double-sided tape, permanent adhesive.

C. Electrical Components and Devices: Listed and labeled as defined in NFPA 70 by a qualified testing agency.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

B. Verify that electrical service is correctly sized and located to accommodate dimensional letter signs.

C. Notify Architect if conditions are not suitable for installation of signs; do not proceed until conditions are satisfactory.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install product level, plumb, and at heights indicated.

C. Install product in locations indicated using mounting methods recommended by sign manufacturer and free from distortion, warp, or defect adversely affecting appearance.

D. Locate dimensional letter signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.

E. Install signs within the following tolerances and in accordance with manufacturer's recommendations:

1. Exterior Signs: Within 1 inch vertically and horizontally of intended location

F. Protect from damage; repair or replace damaged items.

3.03 CLEANING, PROTECTION AND REPAIR

A. Repair scratches and other damage which might have occurred during installation. Replace components where repairs were made but are still visible to the unaided eye from a distance of 10 feet.

B. Remove temporary coverings and protection to adjacent work areas. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove construction debris from project in accordance with provisions in Division 1

END OF SECTION 10 14 19

SECTION 10 44 00

PORTABLE FIRE EXTINGUISHERS

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: Provide hand-portable fire extinguishers where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

A. Use adequate number of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 SUBMITTALS

A. Comply with pertinent provisions of Section 01 33 00, Submittal Procedures.

B. Product data: Within 60 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

1. Materials list of items proposed to be provided under this Section;
2. Manufacturer's specifications, catalog cuts and other data needed to demonstrate compliance with the specified requirements;
3. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

1.4 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01 66 00, Product Storage and Handling Requirements.

PART 2 PRODUCTS

2.1 FIRE EXTINGUISHERS

A. At each location where shown on the Drawings but not less than one (1) per 1,500 sq. ft. building area, provide one (1) multi-purpose chemical fire extinguisher with UL Rating 4A-60BC, 10 lb., ABC dry chemical.

B. Service, charge and tag each fire extinguisher not more than five calendar days prior to the Date of Substantial Completion of the Work as that date is established by the Architect.

PART 3 EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Install the work of this Section in strict accordance with the manufacturer's recommendations as approved by the Architect, anchoring all components firmly into position for long life under hard use.

B. Fire extinguisher to be mounted on walls with standard brackets unless noted to be installed in cabinet.

C. Where indicated to be installed in cabinet, provide Larsen Manufacturing Company Number G2049-R4, 3 ½" projection, 3" depth rough opening, rolled edge, semi-recessed type, vertical series, white face with red letters.

END OF SECTION

SECTION 10 44 10 - INTERIOR ROOM SIGNS

PART 1 GENERAL

.1 SUMMARY

A. Related Documents: Provisions established within the General and Supplementary Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.

B. Section Includes:

1. Room Identification Signage

.2 QUALITY ASSURANCE

A. Obtain all signage products in this and other signage specifications through a single supplier from a single manufacturer.

B. Regulatory Requirements: Products shall meet requirements of the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and local amendments and modifications.

C. Installer: Installation shall be performed by installer specialized and experienced in work similar to that required for this project.

.3 SUBMITTALS

A. Submit in accordance with requirements of Division 1.

B. Product Data: Submit product data for specified products. Include material details for each sign specified.

C. Shop Drawings: Submit shop drawings showing layout, profiles, and product components, including dimensions, anchorage, and accessories. Provide floor plans with locations of each sign type.

D. Submit signage schedule in manufacturer’s format for verification of text/copy.

E. Samples: Submit supplier’s standard color chart for selection purposes and selected colors for verification purposes. Submit sample of two (2) sign types.

F. Installation: Submit supplier’s installation instructions.

G. Closeout Submittals:

1. Submit operation and maintenance data for installed products, including precautions against harmful cleaning materials and methods.
2. Submit warranty documents specified herein.

.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Division 1.

1. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
2. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
3. Store products protected from weather, temperature, and other harmful conditions as recommended by supplier.
4. Handle products in accordance with manufacturer's instructions.

.5 WARRANTY

A. Project Warranty: Comply with requirements of Division 1.

B. Manufacturer's Warranty: Submit manufacturer's standard warranty document, executed by authorized company official, against defects in materials and workmanship..

1. Warranty Period: Five (5) years from product ship date.

PART 2 PRODUCTS

.1 SIGNAGE SYSTEMS

A. Acceptable Manufacturers:

B. The following manufacturer and product are used as a basis of design

1. ASI Signage Innovations, 5200 Commerce Point Harahan, Louisiana 70123; (504) 704-1000 x 124 telephone; (504) 704-1006 facsimile.
2. Acceptable Product: ASI Venus Series
3. Additional manufacturers shall submit equal product data 10 days before advertised bid date for architect's review. The architect has sole discretion to accept or deny substitutions.
4. Approved equal: Takeform, Vivid. 1-800-528-1398, www.takeform.net

.2 SIGN MATERIALS

A. Sign Face: High impact cast matte acrylic with integral text and braille.

B. Tactile Graphics and Text: Provide tactile copy and grade 2 Braille raised 1/32 inch minimum from plaque surface using manufacturer's 3D printed process.

1. Provide lettering and graphics precisely formed, uniformly opaque to comply with relevant ADA regulations and requirements indicated for size, style, spacing, content, position, and colors. Text should have matte gloss level and square shoulders.
2. Colors: Background color is first surface painted. Text Color is tipped.
3. Cast acrylic sheet to be laser cut to shape then painted to allow for painted edges.
4. Colors, patterns, font shall be selected by Architect.

C. Sign Type Description-

1. Frame: ASI Venus Series ; Flat Face with optional Accent Bar.
2. Clear Anodized Aluminum End Caps
3. Inserts: ADA insert. Material: Provide tactile copy and Grade 2 Braille raised 1/32 inch minimum from plaque first surface by manufacturer's aluminum backed photopolymer process. Sign face of single material (.040 aluminum backed photopolymer), tactile characters and Braille integral to photopolymer.
4. Frame panel color: [Clear Anodized Aluminum] To be selected by architect.
5. Insert panel color: [To be selected by Architect from manufacturer's standard color chart.]
6. Letter style[s] and letter size[s]: [To be selected by Architect from manufacturer's standard letter styles chart.]
7. Text or graphic technique:
   a. [Raised copy to be tipped, color to be selected by Architect from manufacturer's standard color chart]
8. Text schedule: [Architect shall verify correct capitalization.]
9. Wall Mounting: VHB tape and silicone or mechanically fasten with appropriate hardware.

10. Sign Types (typical)
    a. Sign Type II – 4" x 6" EXIT, mounted for "low level" as per Code.
    b. Sign Type IV – 6" x 6" Room doors

.3 INSTALLATION METHOD

A. Tape Mount or Screw Mount with counter sunk holes and silicone. Signs on glass to have vinyl backer the same dimension as sign. All others to be screw mounted. Backer to have countersunk holes with face piece tape mounted over backer to conceal mounting.

.4 FABRICATION - GENERAL

A. General: Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.

B. Preassemble signs in the shop to the greatest extent possible to minimize field assembly. Disassemble signs only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation, in a location not exposed to view after final assembly.

C. Conceal fasteners if possible; otherwise, locate fasteners to appear inconspicuous.

D. Form panels to required size and shape. Comply with requirements indicated for design, dimensions, finish, color, and details of construction.

E. Coordinate dimensions and attachment methods to produce message panels with closely fitting joints. Align edges and surfaces with one another in the relationship indicated.

PART 3 EXECUTION

.1 EXAMINATION

A. Site Verification of Conditions: Verify installation conditions previously established under other sections are acceptable for product installation in accordance with manufacturer's instructions.

B. Scheduling of installation by Owner or its representative implies that substrate and conditions are prepared and ready for product installation. Proceeding with installation implies installer’s acceptance of substrate and conditions.

.2 INSTALLATION

A. Install product in accordance with supplier’s instructions.

B. Install product in locations indicated using mounting methods recommended by sign manufacturer and free from distortion, warp, or defect adversely affecting appearance.

C. Install product level, plumb, and at heights indicated.

D. Install product at heights to conform to Americans with Disabilities Act Accessibility Guidelines (ADAAG) and applicable local amendments and regulations.

E. Install signs within the following tolerances and in accordance with manufacturer's recommendations:

1. Interior Signs: Within 1/4 inch vertically and horizontally of intended location.

.3 CLEANING, PROTECTION, AND REPAIR

A. Repair scratches and other damage which might have occurred during installation. Replace components where repairs were made but are still visible to the unaided eye from a distance of 5 feet.

B. Remove temporary coverings and protection to adjacent work areas. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove construction debris from project in accordance with provisions in Division 1.

.4 SIGN SCHEDULE

A. Schedule: Refer to Drawings for sizes, locations, and layout of signage types, sign text copy, and graphics.

END OF SECTION

SECTION 10 73 00

ALUMINUM WALKWAY COVERS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: Design, fabrication, and installation of extruded aluminum walkway cover system.

B. Custom suspended (Wall Supported) Canopy with hanger rods with yoke ends, outriggers, connection brackets at pre-cast concrete columns.

1.02 REFERENCES

A. The Aluminum Association **(AA)**:

1. The Aluminum Design Manual 2000, Specifications & Guidelines for Aluminum Structures.

B. American Architectural Manufacturers Association **(AAMA)**:

1. **AAMA** 611, Voluntary Specification for Anodized Architectural Aluminum.
2. **AAMA** 2603, Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
3. AAMA 2605, Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.

C. American Society of Civil Engineers (ASCE):

1. ASCE 7, Minimum Design Loads for Buildings and Other Structures.

D. American Society for Testing and Materials (ASTM):

1. ASTM B 209, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
2. ASTM B 221, Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

E. American Welding Society **(AWS)**:

1. **ANSI/AWS D1.2**, Structural Welding Code-Aluminum.

1.03 SYSTEM DESCRIPTION

A. Design Requirements:

1. Design Walkways in accordance with The Aluminum Design Manual 2000.
2. Comply with the wind requirements of ASCE 7.
3. Provide an extruded aluminum system complete with internal drainage.
4. Provide expansion joints to accommodate temperature changes of 120 degrees F. Provide expansion joints with no metal to metal contact.

1.04 SUBMITTALS

A. Product Data: Manufacturer's product information, specifications, and installation instructions for walkway cover components and accessories.

B. Shop Drawings: Include plan dimensions, elevations, and details, including all fasteners, anchors, bolts, etc. as required for a complete installation.

C. Samples:
   1. Selection: Manufacturer's standard range of colors for the finishes selected.
   2. Verification: 2-inch-square samples of each finish selected on the substrate specified.

D. Design Data: Design calculations bearing the seal of a Registered Professional Engineer, licensed in the state where the project is located. Design calculations shall state that the walkway cover system design complies with the wind requirements of ASCE 7, the stability criteria of applicable building code, and all other governing criteria, including fasteners, anchors, and connection brackets.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: At least ten years experience in the design, fabrication, and erection of extruded aluminum walkway cover systems.

B. Installer Qualifications: Have walkway covers installed by manufacturer, third party installation is not acceptable.

PART 2 PRODUCT

2.01 MANUFACTURERS

A. The design is based on products fabricated by: Peachtree Protective Covers, Inc., 3255 South Sweetwater Rd., Lithia Springs, GA 30122, 770-439-2120, fax 770-439-2122.
   1. Comparable products by the following manufacturers also will be acceptable:
      a. Dittmer Architectural Aluminum
      b. MASA Architectural Canopies
   2. Substitutions: Comparable products of other manufacturers will be considered under standard substitution procedures.

2.02 MATERIALS

A. Aluminum Members: Extruded aluminum, ASTM B 221, 6063 alloy, T6 temper.

B. Fasteners: Aluminum, 18-8 stainless steel, or 300 series stainless steel.

C. Gaskets: Dry seal santoprene pressure type.

D. Aluminum Flashing: ASTM B 209, Type 3003 H14, 0.040 inch, minimum.

2.03 FABRICATION

A. General:
   1. Shop Assembly: Assemble components in shop to greatest extent possible to minimize field assembly.

2. Welding: In accordance with ANSI/AWS D1.2.
3. Bent Construction: Factory assemble beams to columns to form one-piece rigid bents. Where used make welds smooth and uniform using an inert gas shielded arc. Perform suitable edge preparation to assure 100% penetration. Grind welds only where interfering with adjoining structure to allow for flush connection. Field welding is not permitted. Rigid mechanical joints can be used if supported by engineering calculations and/or testing.
4. Deck Construction: Fabricate from extruded modules that interlock in a self-flashing manner. Positively fasten interlocking joints creating a monolithic structural unit capable of developing the full strength of the sections. The fastenings must have minimum shear strength of 350 pounds each. Assemble deck with sufficient camber to offset dead load deflection.

B. Beams: Provide 6" x 8" or 4” x 6” beams as shown on drawings, open-top tubular extrusion, top edges thickened for strength and designed to receive deck members in self-flashing manner. Tapered closed ends on beams where shown on drawings.

C. Deck: Extruded self-flashing sections interlocking into a composite unit. Deck to be 4" high with 6" spacing. Provide closures at deck ends.

D. Fascia: Manufacturer’s standard shape. Provide fascia splices where continuous runs of fascia are jointed. Locate splices to be in line with bents and fasten in place on hidden or non-vertical surfaces.

E. Factory Finishing: Finish designations prefixed by AA comply with system established by the AAMA for designating aluminum finishes.

Clear Anodized Aluminum

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of Conditions: Verify that all concrete, masonry, and roofing work in the vicinity is complete and cleaned.

3.02 ERECTION

A. Erect protective cover true to line, level, and plumb.
B. Provide hairline miters and fitted joints.
C. Anchor brackets and canopy members to pre-cast concrete columns with anchors as per Drawings.

3.03 CLEANING

A. Clean all protective cover components promptly after installation.

PROTECTION

B. Protect materials during and after installation.

END OF SECTION

SECTION 10 80 00

SPECIALTIES/MISCELLANEOUS

PART 1 GENERAL

1.1 DESCRIPTION

A. Work of this Section includes miscellaneous items complete.

1.2 STANDARDS

A. Materials specified in this section have reference to specific standards, commercial standards, Federal Specification, trade association standards, individual brand names or other similar standards and shall comply with requirements of the latest editions thereof.

1.3 SHOP DRAWINGS

A. Submit in quadruplicate, Shop Drawings and Installation Drawings and information sheets or brochures on all items listed in accordance with requirements of General Conditions.

PART 2 PRODUCTS

2.1 ROOF HATCH

A. Bilco, Single Leaf Roof Scuttle, Type S, 30" x 36" frame opening, 11ga aluminum cover and frame,
B. Approved equal: Babcock-Davis
C. Approved equal: Precision, Model PH.

2.2 FIXED LADDER

A. O'Keeffe's Inc., Model 500, fixed access aluminum ladder,
B. Approved equal: Precision Ladders, LLC, Model FL.

2.3 WINDOW BLINDS

A. At each exterior window, provide and install horizontal window blinds, equal to Levolor Faux Wood, manual operation, cordless 2" slats, contemporary, inside mount, multiple blinds per handrail.
B. Install as per manufacturer instructions and provide all required components and hardware.
C. Approved equal: Hunter Douglas Everwood

2.4 TWO-WAY COMMUNICATION PANEL – AREA OF RESCUE ASSITANCE

A. Rath, Smart Rescue, Model 2500-205 FM
B. Approved equal: TekTone, Model IR150SSF, flush-mount.
C. See ELECTRICAL.

2.5 FLOOR OPENING JOINT SEAL

A. Where indicated on the Drawings, at opening between first and second floors, install joint seal equal to the following:
   1. Construction Specialties, Model 2HFR-200.
   2. Cut to fit location and install as per Manufacturer's recommendations.

2.6 PONY WALL SUPPORT

A. Where indicated on the Drawings, at low partition in Dental Clinic, install pony wall support member equal to the following:
   1. Clark-Dietrich, Pony Wall Lite, 16ga, 36" nom. Height.
   2. Install at ends and center of low partition wall.
   3. Install as per manufacturer's recommendations.

2.7 PASS-THRU WINDOWS

A. Where indicated on the Drawings, for windows mark F and G, install pass-thru window system equal to the following:
   1. FHC, Shannon Series, XX (two (2) sliding panels), satin anodized finish.
   2. Dimensions as per Drawings.
   3. Clear safety glass panels.
   4. Include all standard features.

2.8 METAL COMPOSITE MATERIAL (MCM) WALL PANELS

A. Where indicated on the Drawings, at various locations, install MCM panels equal to the following:
   1. 3A Composites, Alucoband Plus, Face Fastened.
   2. Install as per manufacturer's recommendations.
   3. Clear anodized aluminum panels and trim.
   4. Include all required supports, trim, and fasteners as part of system.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's recommendations.

B. Refer to Drawings for location and related trades.

END OF SECTION

DIVISION ELEVEN
EQUIPMENT

CONTENTS

None in this Project Manual

DIVISION TWELVE
FURNISHINGS

CONTENTS

None in this Project Manual

DIVISION THIRTEEN
SPECIAL CONSTRUCTION

None in this Project Manual

DIVISION FOURTEEN
CONVEYING SYSTEMS

CONTENTS

None in this Project Manual

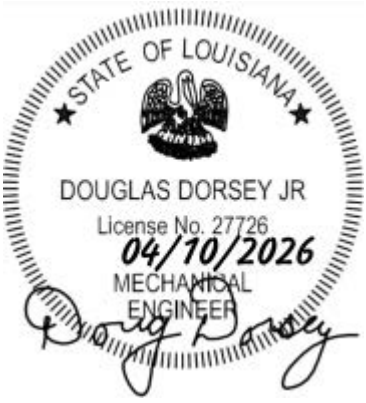
DIVISION TWENTY-ONE
FIRE SUPPRESSION

CONTENTS

None in this Project Manual

DIVISION 22
PLUMBING

22 01 00	PLUMBING OPERATING AND MAINTENANCE MANUALS
22 05 00	PLUMBING GENERAL PROVISIONS
22 05 10	PLUMBING CONTRACT QUALITY CONTROL
22 05 12	PLUMBING SHOP DRAWINGS, COORDINATION DRAWINGS & PRODUCT DATA
22 05 13	ELECTRICAL PROVISIONS OF PLUMBING WORK
22 05 14	PLUMBING ALTERATIONS PROJECT PROCEDURES
22 05 15	PLUMBING EARTHWORK
22 05 16	EXCAVATING, BAKFILLING AND COMPACTING FOR UTILITIES OUTSIDE BUILDING SLAB
22 05 17	PLUMBING ACCESS DOORS
22 05 23	VALVES, STRAINERS AND VENTS
22 07 19	PIPE INSULATION FOR PLUMBING AND HVAC
22 11 16	DOMESTIC WATER PIPING AND APPURTENANCES
22 13 16	SOIL, WASTE, & SANITARY DRAIN PIPING, VENT PIPING AND APPURTENANCES
22 20 00	PLUMBING PIPE AND PIPE FITTINGS
22 40 00	PLUMBING FIXTURES AND FIXTURE CARRIERS
22 63 11	GAS PIPING AND APPURTENANCES
22 63 13	MEDICAL GAS PIPING SYSTEMS



SECTION 22 01 00

PLUMBING OPERATING AND MAINTENANCE MANUALS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Compilation product data and related information appropriate for Owner's operation and maintenance of products furnished under Contract. Prepare operating and maintenance data as specified.

B. Instruct Owner's personnel in operation and maintenance of equipment and systems.

C. Submit three copies of complete manual in final form.

1.2 SUBMITTALS

A. Thirty (30) days after the Contractor has received the final scheduled identified submittals bearing the Architect/Engineer's stamp of acceptance (including resubmittals), submit for review one copy of the first draft of the Operating and Maintenance Manual. This copy shall contain as a minimum:

1. Table of Contents for each element.
2. Contractor information.
3. All submittals, coordination drawings and product data, reviewed by the Architect/Engineer; bearing the Architect/Engineer's stamp of acceptance. (When submittals are returned from Engineer "Correct as Noted", corrected inserts shall be included.)
4. All parts and maintenance manuals for items of equipment.
5. Warranties (without starting dates)
6. Certifications that have been completed. Submit forms and outlines of certifications that have not been completed.
7. Operating and maintenance procedures.
8. Form of Owner's Training Program Syllabus (including times and dates).
9. Control operations/equipment wiring diagrams.
10. Other required operating and maintenance information that are complete.

B. Copy will be returned to the Contractor with comments for corrections.

C. Submit three (3) completed manuals in final form to the Architect/Engineer one day after substantial completion, and prior to Owner's instructions. Include all specified data, test and balance reports, drawings, dated warranties, certificates, reports, along with other materials and information.

D. The Architect/Engineer will review the manuals for completeness.

E. The Contractor shall be notified of any missing or omitted materials. The Manuals shall be reworked by the Contractor, as required, in the office of the Architect / Engineer. The manuals will not be retransmitted.

F. Two (2) complete Manuals will be delivered to the Owner.

PART 2 - PRODUCTS

2.1 BINDERS

A. Commercial quality black three-ring binders with clear overlay plastic covers.

B. Minimum ring size: 1".
Maximum ring size: 3".

C. When multiple binders are used, correlate the data into related groupings.

D. Label contents on spine and face of binder with full size insert. Label under plastic cover.

PART 3 - EXECUTION

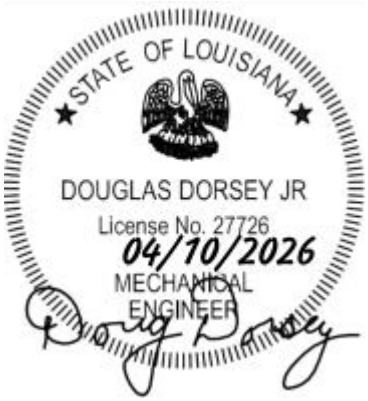
3.1 OPERATION AND MAINTENANCE MANUAL

A. Form for Manuals:
   1. Prepare data in form of an instructional manual for use by Owner's personnel.
   2. Format:
      a. Size: 8-1/2" x 11".
      b. Text: Manufacturer's printed data or neatly typewritten.
   3. Drawings:
      a. Provide reinforced punched binder tab and bind in text.
      b. Fold larger drawings to size of text pages.
   4. Provide flyleaf indexed tabs for each separate product or each piece of operating equipment.
   5. Cover: Identify each volume with typed or printed title "Operating and Maintenance Instructions". List:
      a. Title of Project
      b. Identity of separate structures as applicable.
      c. Identity of general subject matter covered in the manual.
   6. Binder as specified.

B. Content of Manual:
   1. Neatly typewritten Table of Contents for each volume arranged in systematic order as outlined in the specifications.
      a. Contractor, name of responsible principal, address and telephone number.
      b. A list of each product required to be included, indexed to content of the volume.
      c. List with each product, name, address and telephone number of:
         1) Subcontractor or installer.
         2) Maintenance contractor as appropriate.
         3) Identify area of responsibility of each.
         4) Local source of supply for parts and replacement.
      d. Identify each product by product name and other identifying symbols as set forth in Contract Documents.
   2. Product Data:
      a. Include those sheets pertinent to the specific product.
      b. Annotate each sheet to:
         1) Identify specific product or part installed.
         2) Identify data applicable to installation.
         3) Delete references to inapplicable information. (All options not supplied with equipment shall be marked out indicated in some manner.
   3. Drawings:
      a. Supplement product data with drawings as necessary to illustrate:
         1) Relations of component parts of equipment and systems.
         2) Control and flow diagrams.
      b. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.
      c. Do not use Project Record Documents as maintenance drawings.
   4. Written text, as required to supplement product data for the particular installation:
      a. Organize in consistent format under separate headings for different procedures.
      b. Provide logical sequence of instructions for each procedure.
   5. Copy of each warranty, bond and service contract issued.
      a. Provide information sheet for Owner's personnel, giving:
         1) Proper procedures in event of failure.
         2) Instances that might affect validity of warranties or bonds.
   6. Shop drawings, coordination drawings and product data as specified.

C. Sections for Equipment and Systems.
    1. Content for each unit of equipment and system as appropriate:
        a. Description of unit and component parts.
            1) Function, normal operating characteristics, and limiting conditions.
            2) Performance curves, engineering data and tests.
            3) Complete nomenclature and commercial number of replaceable parts.
        b. Operating procedures:
            1) Start up, break-in, routine and normal operating instructions.
            2) Regulation, control, stopping, shut down and emergency instructions.
            3) Summer and winter operating instructions.
            4) Special operating instructions.
        c. Maintenance procedures:
            1) Routine operations
            2) Guide to trouble-shooting.
            3) Disassembly, repair and reassembly.
            4) Alignment, adjusting and checking.
            5) Routine service based on operating hours.
        d. Servicing and lubrication schedule. List of lubricants required.
        e. Manufacturer's printed operating and maintenance instructions.
        f. Description of sequence of operation by control manufacturer.
        g. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.
            1) Predicted life of part subject to wear.
            2) Items recommended to be stocked as spare parts.
        h. As installed control diagrams by controls manufacturer.
        i. Complete equipment internal wiring diagrams.
        j. Each Contractor's coordination drawings.
        k. As installed color coded piping diagrams.
        l. Charts of valve tag number, with location and function of each valve.
        m. List of original manufacturer's spare parts and recommended quantities to be maintained in storage.
        n. Other data as required under pertinent sections of the specifications.
    1. Prepare and include additional data when the need for such data becomes apparent during instruction of Owner's personnel.
    2. Additional requirements for operating and maintenance data as outlined in respective sections of specifications.
    3. Provide complete information for products specified in Division 22.
    4. Provide certificates of compliance as specified in each related section.
    5. Provide start up reports as specified in each related section.
    6. Provide signed receipts for spare parts and material.
    7. Provide training report and certificates.
    8. Provide backflow preventer certified test reports.
    9. Provide gas piping pressure test reports.

END OF SECTION 22 01 00



SECTION 22 05 00

PLUMBING GENERAL PROVISIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Except as modified in this Section, General Conditions, Supplementary Conditions, applicable provisions of the General Requirements, and other provisions and requirements of the contract documents apply to work of Division 22 Plumbing.

B. Applicable provisions of this section apply to all sections of Division 22, Plumbing.

1.2 CODE REQUIREMENTS AND FEES

A. Perform work in accordance with applicable statutes, ordinances, codes and regulations of governmental authorities having jurisdiction.

B. Plumbing work shall comply with applicable inspection services:
   1. Underwriters Laboratories
   2. National Fire Protection Association
   3. State Health Department
   4. Local Municipal Building Inspection Department

C. Resolve any code violations discovered in contract documents with the Engineer prior to award of the contract. After Contract award, any correction or additions necessary for compliance with applicable codes shall be made at no additional cost to the Owner.

D. This Contractor shall be responsible for being aware of and complying with asbestos NESHAP regulations, as well as all other applicable codes, laws and regulations.

E. Obtain all permits required.

1.3 CONTRACTOR'S QUALIFICATIONS

A. An approved contractor for the work under this division shall be:
   1. A licensed specialist in this field and have the personnel, experience, training, skill, and organization to provide a practical working system
   2. Able to furnish evidence of having contracted for and installed not less than 3 systems of comparable size and type that has served their Owners satisfactorily for not less than 3 years

1.4 REFERENCE SPECIFICATIONS AND STANDARDS

A. Materials which are specified by reference to Federal Specifications; ASTM, ASME, ANSI, or AWWA Specifications; Federal Standards; or other standard specifications must comply with latest editions, revisions, amendments or supplements in effect on date bids are received. Requirements in reference specifications and standards are minimum for all equipment, material, and work. In instances where specified capacities, size, or other features of equipment, devices, or materials exceed these minimums, meet specified capacities.

1.5 CONTRACT DRAWINGS

A. Contract drawings are diagrammatic only and do not give fully dimensioned locations of various elements of work. Determine exact locations from field measurements.

1.6 PROJECT RECORD DOCUMENTS

A. Maintain at the job site a separate set of white prints (blue line or black line) of the contract drawings for the sole purpose of recording the "as-built" changes and diagrams of those portions of work in which actual construction is at variance with the contract drawings. Mark the drawings with a colored pencil. Prepare, as the work progresses and upon completion of work, reproducible drawings clearly indicating locations of various lines, valves, ductwork, traps, equipment, and other pertinent items, as installed. Include flow-line elevation of sewer lines. Record existing and new underground and under slab piping with dimensioned locations and elevations of such piping.

B. At the conclusion of project, obtain without cost to the Owner, erasable mylars of the original drawings and transfer as-built changes to these. Prior to transmittal of corrected drawings, obtain 3 sets of blue-line prints of each drawing, regardless of whether corrections were necessary and include in the transmittal (2 sets are for the Owner's use and one set is for the Architect/Engineer's records). Delivery of these as-built prints and reproducibles is a condition of final acceptance. Provide record drawings on one set each (reproducible Dayrex mylar film positives) and AutoCad 2012 / Revit CAD files on disk (CD Rom).

C. As-Built drawings should indicate the following information as a minimum:
   1. Indicate all addendum changes to documents.
   2. Remove Engineer's seal, name, address and logo from drawings.
   3. Mark documents RECORD DRAWINGS.
   4. Clearly indicate: DOCUMENT PRODUCED BY
   5. Indicate all changes to construction during construction. Indicate actual routing of all piping, ductwork, etc. that were deviated from construction drawings.
   6. Indicate exact location of all underground plumbing and flow line elevation.
   7. Indicate exact location of all underground plumbing piping and elevation.
   8. Indicate exact location of all underground electrical raceways and elevations.
   9. Correct schedules to reflect (actual) equipment furnished and manufacturer.
   10. During the execution of work, maintain a complete set of drawings and specifications upon which all locations of equipment, ductwork, piping, devices, and all deviations and changes from the construction documents in the work shall be recorded.
   11. Location and size of all ductwork and mechanical piping above ceiling including exact location of isolation of domestic and plumbing valves.
   12. Exact location of all electrical equipment in and outside of the building.
   13. Fire Protection System documents revised to indicate exact location of all sprinkler heads and zone valves.
   14. Exact location of all roof mounted equipment, wall, roof and floor penetrations.
   15. Cloud all changes.

1.7 SPACE REQUIREMENTS

A. Consider space limitations imposed by contiguous work in selection and location of equipment and material. Do not provide equipment or material that is not suitable in this respect.

1.8 RELATION WITH OTHER TRADES

A. Carefully study all matters and conditions concerning the project. Submit notification of conflict in ample time to prevent unwarranted changes in any work. Review other Divisions of these specifications to determine their requirements.

B. Because of the complicated relationship of this work to the total project, conscientiously study the relation and cooperate as necessary to accomplish the full intent of the documents.

C. Provide sleeves and inserts in forms as required for the work. Stub up and protect open ends of pipe before any concrete is placed. Furnish sizes of required equipment pads. Furnish and locate bolts and fittings required to be cast in them.

D. Locate and size openings required for installation of work specified in this Division in sufficient time to

prevent delay in the work.

E. Refer to other Divisions of the specifications for the scope of required connections to equipment furnished under that Division. Determine from the Contractor for the various trades, the Owner, and by direction from the Architect/Engineer, the exact location of all items.

1.9 CONCEALED AND EXPOSED WORK

A. When the word "concealed" is used in connection with insulating, painting, piping, ducts and the like, the work is understood to mean hidden from sight as in chases, furred spaces or above ceilings. "Exposed" is understood to mean open to view.

1.10 GUARANTEE

A. Guarantee work for a minimum of 1 year from the date of substantial completion of the project. During that period make good any faults or imperfections that may arise due to defects or omissions in material, equipment or workmanship. At the Owner's option, replacement of failed parts or equipment shall be provided.

1.11 MATERIAL AND EQUIPMENT

A. Furnish new and unused materials and equipment meeting the requirements of the paragraph specifying acceptable manufacturers. Where two or more units of the same type or class of equipment are required, provide units of a single manufacturer.

1.12 NOISE AND VIBRATION

A. Select equipment to operate with minimum noise and vibration. If objectionable noise or vibration is produced or transmitted to or through the building structure by equipment, piping, ducts or other parts of work, rectify such conditions at no additional cost. If the item of equipment is judged to produce objectionable noise or vibration, demonstrate at no additional cost that equipment performs within designated limits on a vibration chart.

1.13 ACCEPTABLE MANUFACTURERS

A. Manufacturers names and catalog number specified under sections of Division 22 are used to establish standards of design, performance, quality and serviceability and not to limit competition. Equipment of similar design, equal to that specified, manufactured by a named manufacturer will be acceptable on approval. A request for prior approval of equipment not listed must be submitted ten (10) days before bid due date. Submit complete design and performance data to the Engineer.

1.14 OPERATING TESTS

A. After all plumbing systems have been completed and put into operation, subject each system to an operating test under design conditions to ensure proper sequencing and operation throughout the range of operation. Tests shall be made in the presence of the Architect/Engineer. Make adjustments as required to ensure proper functioning of all systems. Special tests on individual systems are specified under individual sections. Submit 3 copies of all certifications and test reports adequately in advance of completion of the work to allow for remedial action as required to correct deficiencies discovered in equipment and systems.

1.15 WARRANTIES

A. Submit 3 copies of all warranties and guarantees for systems, equipment, devices and materials. These shall be included in the Operating and Maintenance Manuals.

1.16 BUILDING CONSTRUCTION

A. It shall be the responsibility of each sub-contractor to consult the Architectural and Engineering drawings,

details, and specifications and thoroughly familiarize himself with the project and all job related requirements. Each sub-contractor shall cooperate with the General Contractor to verify that all piping and other items are placed in the walls, furred spaces, chases, etc., so there will be no delays in the job.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 OPENINGS

A. Framed, cast or masonry openings for ductwork, equipment or piping are specified under other divisions. Drawings and layout work for exact size and location of all openings are included under this division.

3.2 HOUSEKEEPING PADS

A. Provide equipment housekeeping pads under all floor mounted and ground mounted plumbing equipment, and as shown on the drawings.

B. Concrete work as specified in Division 3.

C. Concrete pads:
   1. 4" high, rounded edges, minimum 2500 psi unless otherwise indicated on the drawings
   2. Chamfer strips at edges and corner of forms.
   3. Smooth steel trowel finish.
   4. Doweled to existing slab

D. Install concrete curbs around multiple pipe penetrations.

3.3 VANDAL RESISTANT DEVICES

A. Provide a handle for each loose keyed operated valve and hose bibb on the project.

B. Where vandal resistant screws or bolts are employed on the project, deliver to the Owner 2 suitable tools for use with each type of fastener used.

C. Proof of delivery of these items to the Owner shall be included in the Operating and Maintenance Manuals.

3.4 INSTRUCTION OF OWNER'S PERSONNEL

A. Prior to final inspection, conduct an on-site training program to instruct the Owner's operating personnel in the operation and maintenance of the plumbing systems.
   1. Provide the training during the Owner's regular working day.
   2. The Instructors shall each be experienced in their phase of operation and maintenance of building plumbing systems and with the project.

B. Before proceeding with the on-site training program, submit the program syllabus; proposed time and dates; and other pertinent information for review and approval.
   1. One copy to the Owner.
   2. One copy to the Architect/Engineer.

C. The Owner will provide a list of personnel to receive instructions, and will coordinate their attendance at the agreed upon times.

D. Use the operation and maintenance manuals as the basis of instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shut down of each item of equipment.

F. Demonstrate equipment functions (both individually and as part of the total integrated system).

G. Prepare and insert additional data in the operating and maintenance manuals when the need for additional data becomes apparent during instructions.

H. Submit a report within one week after completion of the training program that instructions have been satisfactorily completed. Give time and date of each demonstration and hours devoted to the demonstration, with a list of people present.

I. At the conclusion of the on-site training program, have the person designated by the Owner sign a certificate to certify that he/she has a proper understanding of the system, that the demonstrations and instructions have been satisfactorily completed, and the scope and content of the operating and maintenance manuals used for the training program are satisfactory.

J. Provide a copy of the report and the certificate in an appropriately tabbed section of each Operating and Maintenance Manual.

3.5 EQUIPMENT IDENTIFICATION and PIPE IDENTIFICATION/DIRECTIONAL ARROWS

A. Provide a laminated engraved plastic nameplate on each piece of equipment and starter.
   1. Designation approved by Architect/Engineer.
   2. Equipment includes, but is not limited to, water heaters, pumps, boilers and utility controllers.
   3. Submit schedule of equipment to be included and designations.

B. Provide nameplates with 1/2" high letters and fastened with epoxy or screws.

C. Provide and install industry standard color-coordinated pipe system identification and fluid directional flow arrows at each change in piping direction and/or at a minimum of every 10 feet of straight run of piping.

3.6 OBSTRUCTIONS

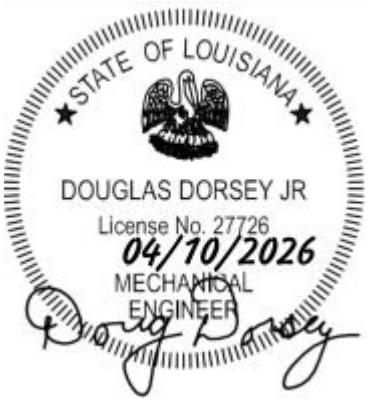
A. The drawings indicate certain information pertaining to surface and subsurface obstructions which has been taken from available drawings. Such information is not guaranteed, however, as to accuracy of location or complete information.
   1. Before any cutting or trenching operations are begun, verify with Owner's representative, utility companies, municipalities, and other interested parties that all available information has been provided.
   2. Should obstruction be encountered, whether shown or not, alter routing of new work, reroute existing lines, remove obstruction where permitted, or otherwise perform whatever work is necessary to satisfy the purpose of the new work and leave existing services and structures in a satisfactory and serviceable condition.

B. Assume total responsibility for and repair any damage to existing utilities or construction, whether or not such existing facilities are shown.

3.7 PROTECTION

A. Protect work, equipment, fixtures, and materials. At work completion, work must be clean and in original manufacturer's condition.

END OF SECTION 22 05 00



SECTION 22 05 10

PLUMBING CONTRACT QUALITY CONTROL

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Contract quality control including workmanship, manufacturer's instructions and demonstrations.

1.2 QUALITY CONTROL PROGRAM

A. Maintain quality control over supervision, subcontractors, suppliers, manufacturers, products, services, site conditions and workmanship to produce work in accordance with contract documents.

1.3 WORKMANSHIP

A. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.

B. Perform work by persons qualified to produce workmanship of specified quality.

C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking. Under no conditions shall material or equipment be suspended from structural bridging.

D. Provide finishes to match approved samples. All exposed finishes shall be approved by the Architect. Submit color samples as required.

1.4 MANUFACTURER'S INSTRUCTIONS

A. Comply with instructions in full detail, including each step in sequence.

B. Should instruction conflict with Contract Documents, request clarification from Architect / Engineer before proceeding.

1.5 MANUFACTURER'S CERTIFICATES

A. When required in individual Specification Sections, submit manufacturer's certificate in duplicate, certifying that products meet or exceed specified requirements.

1.6 MANUFACTURER'S FIELD SERVICES

A. When required in individual Specification Sections, manufacturer shall provide qualified personnel to observe:
   1. Field conditions.
   2. Condition of installation.
   3. Quality of workmanship.
   4. Start-up of equipment.
   5. Testing, adjusting, and balancing of equipment.

B. Representative shall make written report of observations and recommendations to Architect / Engineer.

PART 2 - PRODUCTS

2.1 REFERENCE APPLICABLE SPECIFICATION SECTIONS.

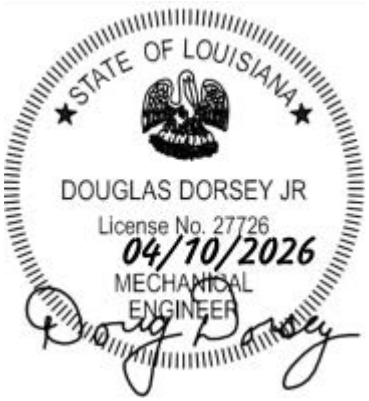
PART 3 - EXECUTION

3.1 PROTECTION OF EQUIPMENT

A. Do not deliver equipment to the project site until progress of construction has reached the stage where equipment is actually needed or until building is closed in enough to protect the equipment from weather. Equipment allowed to stand in the weather will be rejected, and the Contractor is obligated to furnish new equipment of a like kind at no additional cost to the Owner.

B. Adequately protect equipment from damage after delivery to the project. Cover with heavy tarpaulins, drop cloths or other protective coverings as required to protect from plaster, paint, mortar and/or dirt. Do not cover with plastic materials and trap condensate and cause corrosion.

END OF SECTION 22 05 10



SECTION 22 05 12

PLUMBING SHOP DRAWINGS, COORDINATION DRAWINGS & PRODUCT DATA

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Prepare submittals as required by Division 1.

B. The term submittal, as used herein, refers to all:
   1. Shop Drawings
   2. Coordination Drawings
   3. Product data

C. Submittals shall be prepared and produced for:
   1. Distribution as specified
   2. Inclusion in the Operating and Maintenance Manual, as specified, in the related section

1.2 SHOP DRAWINGS

A. Present drawings in a clear and thorough manner. Identify details by reference to sheet and detail, schedule, or room numbers shown on Contract Drawings.

B. Show all dimensions of each item of equipment on a single composite Shop Drawing. Do not submit a series of drawings of components.

C. Identify field dimensions; show relationship to adjacent features, critical features, work, or products.

D. Submit shop drawings in plan, elevation and sections, showing equipment in mechanical equipment areas.

1.3 COORDINATION DRAWINGS

A. Present in a clear and thorough manner. Title each drawing with project name. Identify each element of drawings by reference to sheet number and detail, or room number of contract documents. Minimum drawing scale: ¼" = 1'-0".

B. Prepare coordination drawings to coordinate installations for efficient use of available space, for proper sequence of installation, and to resolve conflicts. Coordinate with work specified in other sections and other divisions of the specifications.

C. For each mechanical room and for each outside equipment pad where equipment is located, submit plan and elevation drawings. Show:
   1. Actual mechanical equipment and components to be furnished
   2. Service clearance
   3. Relationship to other equipment and components
   4. Roof drains and leader piping
   5. Fire protection piping and equipment

D. Identify field dimensions. Show relation to adjacent or critical features of work or products.

E. Related requirements:
   1. Ductwork shop drawings
   2. Coordination drawing specified in Division 26

F. Submit shop drawings in plan, elevation and sections, showing equipment in mechanical equipment areas.

G. Gas piping sketch indicating proposed location of piping prior to proceeding with the installation.

1.4 PRODUCT DATA AND INSTALLATION INSTRUCTION

A. Submit only pages which are pertinent to the project. All options which are indicated on the product data shall become part of the contract and shall be required whether specified are not.

B. Mark each copy of standard printed data to identify pertinent products, referenced to specification section and article number.

C. Show reference standards, performance characteristics and capacities; wiring and piping diagrams and controls; component parts; finishes; dimensions and required clearances.

D. Modify manufacturer's standard schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the work. Delete information not applicable.

E. Mark up a copy of the specifications for the product. Indicate in the margin of each paragraph the following: “Comply, ”Do Not Comply”, or “Not Applicable”. Explain all “Do Not Comply” statements.

F. Provide a separate transmittal for each submittal item. Transmittals shall indicate product by specification section name and number. Separate all submittals into appropriate specification section number. Do not combine specification sections.

1.5 MANUFACTURERS INSTRUCTIONS

A. Submit Manufacturer's instructions for storage, preparation, assembly, installation, start-up, adjusting, calibrating, balancing and finishing.

1.6 CONTRACTOR RESPONSIBILITIES

A. Review submittals prior to transmittal.

B. Determine and verify:
   1. Field measurements
   2. Field construction criteria
   3. Manufacturer's catalog numbers
   4. Conformance with requirements of Contract Documents

C. Coordinate submittals with requirements of the work and of the Contract Documents.

D. Notify the Architect/Engineer in writing at time of submission of any deviations in the submittals from requirements of the Contract Documents.

E. Do not fabricate products, or begin work for which submittals are specified, until such submittals have been produced and bear contractor's stamp. Do not fabricate products or begin work scheduled to have submittals reviewed until return of reviewed submittals with Architect/Engineer's acceptance.

F. Contractor's responsibility for errors and omissions in submittals is not relieved whether Architect/Engineer reviews submittals or not.

G. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved whether Architect/Engineer reviews submittals or not, unless Architect/engineer gives written acceptance of the specific deviations on reviewed documents.

H. Submittals shall show sufficient data to indicate complete compliance with Contract Documents:
   1. Proper sizes and capacities
   2. That the item will fit in the available space in a manner that will allow proper service
   3. Construction methods, materials and finishes

I. Schedule submissions at least 15 days before date reviewed submittals will be needed.

1.7 SUBMISSION REQUIREMENTS

A. Make submittals promptly in accordance with approved schedule, and in such sequence as to cause no delay in the Project or in the work of any other Contractor.

B. Number of submittals required:
   1. Shop Drawings and Coordination Drawings: Submit one reproducible transparency and three opaque reproductions.
   2. Product Data: Submit the number of copies which the contractor requires, plus those which will be retained by the Architect/Engineer.

C. Accompany submittals with transmittal letter, in duplicate, containing:
   1. Date
   2. Project title and number
   3. Contractor's name and address
   4. The number of each Shop Drawing, Project Datum and Sample submitted
   5. Other pertinent data

D. Submittals shall include:
   1. The date of submission
   2. The project title and number
   3. Contract Identification
   4. The names of:
      a. Contractor
      b. Subcontractor
      c. Supplier
      d. Manufacturer
   5. Identification of the product
   6. Field dimensions, clearly identified as such
   7. Relation to adjacent or critical features of the work or materials
   8. Applicable standards, such as ASTM or federal specifications numbers
   9. Identification of deviations from contract documents
   10. Suitable blank space for General Contractor and Architect/Engineer stamps
   11. Contractor's signed and dated Stamp of Approval

E. Coordinate submittals into logical groupings to facilitate interrelation of the several items:
   1. Finishes which involve Architect/Engineer selection of colors, textures or patterns
   2. Associated items which require correlation for efficient function or for installation

1.8 SUBMITTAL SPECIFICATION INFORMATION

A. Every submittal document shall bear the following information as used in the project manual:
   1. The related specification section number
   2. The exact specification section title

B. Submittals delivered to the Architect/Engineer without the specified information will not be processed. The Contractor shall bear the risk of all delays, as if no submittal had been delivered.

1.9 RESUBMISSION REQUIREMENTS

A. Make re-submittals under procedures specified for initial submittals.
   1. Indicate that the document or sample is a re-submittal
   2. Identify changes made since previous submittals

B. Indicate any changes which have been made, other than those requested by the Architect / Engineer.

1.10 CONTRACTOR'S STAMP OF APPROVAL

A. Contractor shall stamp and sign each document certifying to the review of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the work and of Contract Documents.

B. Contractor's stamp of approval on any submittal shall constitute a representation to Owner and Architect/Engineer that Contractor has either determined and verified all quantities, dimensions, field construction criteria, materials, catalog numbers, and similar data or assumes full responsibility for doing so, and that Contractor has reviewed or coordinated each submittal with the requirements of the work and the Contract Documents.

C. Do not deliver any submittals to the Architect/Engineer that do not bear the Contractor's stamp of approval and signature.

D. Submittals delivered to the Architect/Engineer without Contractor's stamp of approval and signature will not be processed. The Contractor shall bear the risk of all delays, as if no submittal had been delivered.

1.11 ARCHITECT/ENGINEER REVIEW OF IDENTIFIED SUBMITTALS

A. The Architect/Engineer will:
   1. Review identified submittals with reasonable promptness and in accordance with schedule
   2. Affix stamp and initials or signature, and indicate requirements for re-submittal or approval of submittal
   3. Return submittals to Contractor for distribution or for resubmission

B. Review and approval of submittals will not extend to design data reflected in submittals which is peculiarly within the special expertise of the Contractor or any party dealing directly with the Contractor.

C. Architect/Engineer's review and approval is only for conformance with the design concept of the project and for compliance with the information given in the contract.
   1. The review shall not extend to means, methods, sequences, techniques or procedures of construction or to safety precautions or programs incident thereto.
   2. The review shall not extend to review of quantities, dimensions, weights or gauges, fabrication processes or coordination with the work of other trades.

D. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

1.12 SUBSTITUTIONS

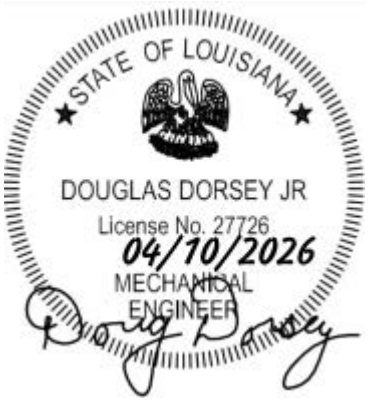
A. Do not make requests for substitution employing the procedures of this Section.

B. The procedure for making a formal request for substitution is specified in Div. 1.

PART 2 - PRODUCTS - NOT USED.

PART 3 - EXECUTION - NOT USED.

END OF SECTION 22 05 12



SECTION 22 05 13

ELECTRICAL PROVISIONS OF PLUMBING WORK

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Electrical provisions to be provided as plumbing work are indicated in other Division 22 sections, on drawings, and as specified.

B. Types of work, normally recognized as electrical but provided as plumbing, specified or partially specified in this Section, include but are not necessarily limited to the following:
   1. Motors for plumbing equipment.
   2. Starters or Variable Frequency Drives (VFD's) for motors of plumbing equipment.
   3. Wiring from motors to disconnect switches or junction boxes for motors of plumbing equipment, but only where specifically indicated to be furnished integrally with equipment.
   4. Wiring of field-mounted float control switches, flow control switches, and similar plumbing-electrical devices provided for plumbing systems, to equipment control panels.
   5. Pipe heat tracing.

C. Refer to Division 22 sections for specific individual plumbing equipment electrical requirements.

D. Refer to Division 26 sections for junction boxes and disconnect switches required for motors and other electrical units of plumbing equipment.

1.2 RELATED WORK

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections, apply to work of this Section.

1.3 QUALITY ASSURANCE

A. Wherever possible, match elements of electrical provisions of plumbing work with similar elements of electrical work specified in Division 26 sections for electrical work not otherwise specified.

B. For electrical equipment and products, comply with applicable NEMA standards, and refer to NEMA standards for definitions of terminology. Comply with National Electrical Code (NFPA 70) for workmanship and installation requirements.

1.4 SUBMITTALS

A. Include in listing of motors, voltage, notation of whether motor starter is furnished or installed integrally with motor or equipment containing motors.

PART 2 - PRODUCTS

2.1 MOTORS

A. Provide motors for plumbing equipment manufactured by one of the following:
   1. Baldor Electric Company.
   2. Century Electric Div., Inc.
   3. General Electric Co.
   4. Louis Allis Div.; Litton Industrial Products, Inc.
   5. Lincoln Electric
   6. Marathon Electric Mfg. Corp.
   7. Reliance Electric Co.
   8. Westinghouse Electric Corp.

B. Motor Characteristics. Except where more stringent requirements are indicated, and except where required items of plumbing equipment cannot be obtained with fully complying motors, comply with the following requirements for motors of plumbing work:

C. Temperature Rating. Rated for 40°C environment with maximum 50°C temperature rise for continuous duty at full load (Class A Insulation).

D. Provide each motor capable of making starts as frequently as indicated by automatic control system, and not less than 5 starts per hour for manually controlled motors.

E. Phases and Current Characteristics. Provide squirrel-cage induction polyphase motors for 3/4hp and larger, and provide capacitor-start single-phase motors for 1/2hp and smaller, except 1/6hp and smaller may, at equipment manufacturer's option, be split-phase type. Coordinate current characteristics with power specified in Division 26 sections, and with individual equipment requirements specified in other Division 22 requirements. For 2-speed motors provide 2 separate windings on polyphase motors. Do not purchase motors until power characteristics available at locations of motors have been confirmed, and until rotation directions have been confirmed.

F. Service Factor. 1.15 for polyphase motors and 1.35 for single-phase motors.

G. Motor Construction. Provide general purpose, continuous duty motors, Design "B" except "C" where required for high starting torque.
   1. Frames. NEMA #56.
   2. Bearings are to be ball or roller bearings with inner and outer shaft seals, regreasable except permanently sealed where motor is inaccessible for regular maintenance. Where belt drives and other drives produce lateral or axial thrust in motor, provide bearings designed to resist thrust loading. Refer to individual section of Division 22 for fractional-hp light-duty motors where sleeve-type bearings are permitted.
   3. Except as indicated, provide open drip-proof motors for indoor use where satisfactorily housed or remotely located during operation, and provide guarded drip-proof motors where exposed to contact by employees or building occupants. Provide weather-protected Type I for outdoor use, Type II where not housed. Refer to individual sections of Division 22 for other enclosure requirements.
   4. Provide built-in thermal overload protection and, where indicated, provide internal sensing device suitable for signaling and stopping motor at starter.
   5. Noise Rating: Provide "Quiet" rating on motors.

H. All motors shall be premium efficiency.

I. Motors operated utilizing variable frequency drives shall include grounding rings and shall be inverter duty rated.

2.2 EQUIPMENT FABRICATION

A. Fabricate plumbing equipment for secure mounting of motors and other electrical items included in work. Provide either permanent alignment of motors with equipment, or adjustable mountings as applicable for belt drives, gear drives, special couplings and similar indirect coupling of equipment. Provide safe, secure, durable, and removable guards for motor drives. Arrange for lubrication and similar running-maintenance without removal of guards.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install motors on motor mounting systems in accordance with motor manufacturer's instructions, anchored to resist torque, drive thrusts, and other external forces inherent in plumbing work. Secure sheaves and other drive units to motor shafts with keys and Allen set screws on flat surface of shaft. Unless otherwise indicated, set motor shafts parallel with machine shafts.

B. Verify voltage with Electrical Plans.

END OF SECTION 22 05 13

SECTION 22 05 14

PLUMBING ALTERATIONS PROJECT PROCEDURES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Inspect and service existing equipment and materials that are to remain or to be reused.

B. Disposal of equipment, materials, or housekeeping pads to be abandoned. Prior to disposal, the Contractor shall verify with the Owner what is to be salvaged by the Owner and what is to become the property of the Contractor.

C. Handling of equipment and materials to be removed.

1.2 QUALITY ASSURANCE

A. Coordination with the Owner prior to the disconnection or shutdown of existing equipment, or to the modification of existing operational systems.

1.3 CONTRACT DRAWINGS

A. There is the possibility that existing conditions and devices are affected by the work indicated on the drawings and called for in the specifications (project manual) that do not appear on the drawings. It is the Contractor's responsibility to visit the site and determine all of the existing conditions and to consider these existing conditions when making and presenting a proposal, to have a complete proposal.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. Material used to upgrade and repair existing equipment shall conform to that specified.

B. Material used to upgrade and repair existing equipment shall not void existing warranties or listings of the equipment to be upgraded or repaired.

C. Material used to upgrade and repair existing equipment shall be new and shall be of the same manufacturer of the existing equipment, shall be acquired through the existing original equipment manufacturer's approved distribution channels, shall have manufacturer's warranties for the new material being used, and shall be listed for the use intended.

PART 3 - EXECUTION

3.1 INSPECTION

A. Existing materials and equipment indicated on the drawings or in the specifications to be reused shall be inspected for damaged or missing parts. Contractor shall notify the Architect/Engineer, in writing, accordingly.

B. If using materials specified or shown on the drawing voids or diminishes the warranty or operation of remaining equipment or systems, the Contractor shall notify the Architect/Engineer, in writing.

C. Verify field measurements, above and underground piping connections and flows.

D. Demolition Drawings are based on casual field observation, and when available, existing record documents. Report discrepancies to Architect before disturbing existing installation, and immediately after such discrepancies are discovered.

E. Field verify existing conditions and actual utility uses prior to final connections. Existing drawings may not have been available for all required information. Use pipe inspection camera system to field verify existing sanitary / grease waste connections. Verify flow direction and depth prior to connection to existing plumbing systems.

3.2 APPLICATION

A. Existing materials and equipment indicated on the drawings or in the specifications to be reused shall be cleaned and reconditioned, including cleaning of piping systems prior to installation and reuse.

B. Material and equipment removed that is not to be salvaged for Owner's use or for reuse on the project shall become the property of the Contractor and be removed from the site.

C. Material or equipment salvaged for Owner's use shall be carefully handled and stored where directed by the Owner or the Architect / Engineer. Relocate material and / or equipment as directed by Owner.

D. Materials and equipment not indicated to be removed or abandoned shall be reconnected to the new system.

E. Materials, equipment and housekeeping pads not to be reused or reconnected shall be removed for Owner's review and salvaged by Contractor.

F. Prior to start of construction, Contractor shall walk areas to be renovated with Owner to identify and document items to be salvaged for Owner's use.

G. Clean and repair existing materials and equipment that remain or are to be reused.

H. Contractor shall utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

3.3 SEQUENCE AND SCHEDULE

A. Coordinate utility service outages with Utility Company, Architect and Owner.

B. Provide additional or temporary valves, piping and connections to maintain existing systems in service during construction.

C. Existing Plumbing Service: Refer to drawings for work in remodeled areas. Where facilities in these areas are to remain in service, any related work to keep the facilities in operation is specified in this Division. Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Schedule and obtain approval/permission from Owner at least 48 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area. Maintain acceptable temperature and humidity control within existing building during renovation activities.

D. Remove and replace existing Plumbing systems and appurtenances as occasioned by new or remodeled construction. Re-establish service that may be interrupted by remodeled construction.

E. Refer to other drawings series for work in remodeled areas. Where facilities in these areas are required to remain in service, any related work required to keep these facilities in operation is specified in this Division.

F. Remove and replace existing piping coincident with the construction.

G. Remove or relocate existing piping or housekeeping pads as occasioned by new or remodeled construction. Cap unused domestic piping beyond the new finish line.

H. Relocate all domestic piping as required to accommodate new work requiring precedence.

I. Remove concrete housekeeping pad where materials or equipment have been removed.

J. Remove all known utilities that do not provide service to the buildings that remain.

K. Remove existing plumbing vent penetrations through roof not to be reused.

3.4 DEMOLITION AND EXTENSION OF EXISTING PLUMBING WORK

A. The Contractor shall modify, remove, and/or relocate all materials and items so indicated on the drawings or required by the installation of new facilities. All removals and/or dismantling shall be conducted in a manner as to produce maximum salvage. Salvage materials shall remain the property of the Owner, and shall be delivered to such destination as directed by the Owner's representative unless they are not wanted, then it will be the responsibility of this Contractor to remove such items and properly dispose of them. Materials and/or items scheduled for relocation and which are damaged during dismantling or reassembly operations shall be repaired and restored to good operative condition. The Contractor may, at his discretion, and upon approval of the Owner's representative substitute new materials and/or items of like design and quality in lieu of materials and/or items to be relocated.

B. All items to be relocated shall be carefully removed in reverse to original assembly or placement and protected until relocated. The Contractor shall clean, repair, and provide all new materials, fittings, and appurtenances required to complete the relocations and to restore them to good operative order. All relocations shall be performed by workmen skilled in the work and in accordance with standard practice of the trades involved.

C. When items scheduled for relocation and/or reuse are found to be in damaged condition before work has been started on dismantling, the Contractor shall call the attention of the Owner's representative to such items and receive further instructions before removal. Items damaged in repositioning operations are the contractor's responsibility and shall be repaired or replaced by the contractor as approved by the owner's representative, at no additional cost to the Owner.

D. Plumbing, piping and appurtenances to be removed, salvaged, or relocated shall be removed to points indicated on the drawings, specified, or acceptable to the Owner's representative. Piping not scheduled for reuse shall be removed to the points at which reuse is to be continued or service is to remain. Such services shall be sealed, capped, or otherwise tied-off or disconnected in a safe manner acceptable to the Construction Inspector. All disconnections or connections into the existing facilities shall be done in such a manner as to result in minimum interruption of services to adjacent occupied areas. Services to existing areas or facilities that must remain in operation during the construction period shall not be interrupted without prior specific approval of the Owner's representative hereinbefore specified.

E. Repair adjacent construction and finishes damaged during demolition and extension work.

F. Maintain access to mechanical installations that remain active. Modify installation or provide access panel as appropriate.

G. Extend existing installations using materials and methods compatible with existing plumbing installations, or as specified.

H. Existing plumbing piping and devices found to need additional hangers installed should be added at no additional cost to the Owner.

3.5 PROTECTION OF THE WORK

A. Provide adequate temporary support and auxiliary structure as necessary to ensure structural value or integrity of affected portion of work.

B. Provide devices and methods to protect other portions of work from damage.

C. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances and finishes.

3.6 IDENTIFICATION OF EQUIPMENT IN RENOVATED AREAS

A. Identification of Equipment: Provide new identification of all existing equipment to be reused and located within the renovated areas. Do not include the description “existing”. Provide new nameplates for all existing plumbing equipment in renovated areas as specified in Plumbing General Provisions.

END OF SECTION 22 05 14

SECTION 22 05 15

PLUMBING EARTHWORK

PART 1 – GENERAL

1.1 GENERAL

A. Excavate and backfill for pipe trenches for underground piping, and excavate for structures installed as part of plumbing work.

PART 2 - PRODUCTS - NOT USED.

PART 3 - EXECUTION

3.1 EXCAVATION

A. Excavate trenches for underground piping to the required depth to ensure 2 feet minimum coverage over piping.

B. Cut the bottom of the trench or excavation to uniform grade.

C. Should rock be encountered, excavate 6 inches below grade, fill with bedding material and tamp well.

D. Lay out alignment of pipe trenches to avoid obstructions. Assure that proposed route of pipe will not interfere with building foundation before any cutting is begun. Should interference be found, contact the Architect/Engineer before proceeding.

3.2 BACKFILL

A. Backfill shall not be placed until the work has been inspected, tested and approved. Complete backfill to the surface of natural ground or to the lines and grades shown on drawings. Except where special materials are requested, use suitable friable soils from other excavation as backfill material. Do not use peat, silt, muck, debris or other organic materials. Deposit backfill in uniform layers and compact each layer as specified in Division 2.

B. Compacting Backfill. Place material in uniform layers of prescribed maximum thickness and wet or dry the material to optimum moisture content. Compact with power-driven tampers to the prescribed density. Place regular backfill in 8 inch maximum layers, loose measure. Compact to not less than 95% of maximum soil density as determined by ASTM D-698 Standard Proctor.

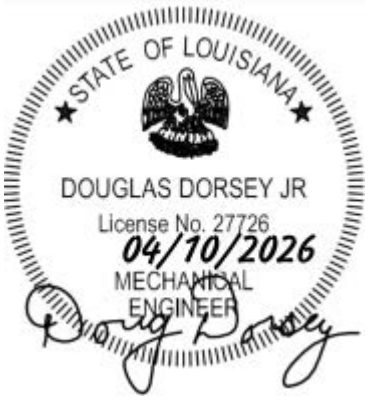
C. Restoration. Compact backfill, where trenching or excavation is required in improved areas such as pavements, walks, and similar areas, to a condition equal to the adjacent undisturbed earth, and restore surface of the area to the condition existing prior to trenching or excavating operation.

D. Provide 6 inch stabilized sand bed with 4 inch stabilized sand cover around each pipe.

3.3 DISPOSAL OF EXCESS MATERIAL

A. Remove excess excavation material or material unsuitable for backfill. Excess material can be spread on grade, or shall be removed from site as directed by the Owner/Architect.

END OF SECTION 22 05 15



SECTION 22 05 16

EXCAVATING, BACKFILLING AND COMPACTING FOR UTILITIES OUTSIDE BUILDING SLAB

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 apply to this section.

B. Refer to Instructions to Bidders for substitution of materials and products.

C. Addenda issued during the bidding period that affect this section of the specifications.

1.2 WORK INCLUDED

A. Coordinating all excavating and backfilling for the underground storm sewer, sanitary sewer, water distribution lines, and all related appurtenances.

B. The extent of lines, excavation, and backfill shall be in conformance with the locations, lines, elevations and grades shown on the drawings prepared by the MEP Engineer.

1.3 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. Earthwork

B. Water Distribution

C. Sanitary Sewer

D. Plumbing

1.4 REFERENCES

A. American Society for Testing and Materials (ASTM) Use current edition.
   1. ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3)
   2. ASTM D1556, Standard Test method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
   3. ASTM D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table
   4. ASTM D4254, Standard Test Method for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density

B. Local Governing Agencies

1.5 WARRANTY

A. Provide written warranty against defects in the material and workmanship for the work of this Section for a period of one year from the Date of Substantial Completion of the Project. Refer to Division 1 for Warranty form.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Cement-Stabilized Sand: Clean, local sand mixed with not less than 1-1/2 sacks of Portland cement per ton; mix in a mill-type mixer.

B. Sand: Clean, local sand

C. Earth Backfill: Clean local material consistent with the surrounding earth material and free of large clods, roots, rocks or other debris.

PART 3 – EXECUTION

3.1 EXCAVATION

A. General:
   1. All utility trenches shall be constructed in conformance with OSHA trench safety standards.
   2. Sheeting and shoring shall be accomplished to the extent necessary to maintain the sides of the trench in a vertical position throughout the construction period for trenches five feet in depth or deeper. Where approved, trench sides may be laid back in lieu of shoring to meet OSHA safety standards.
   3. Utilities shall not be constructed or laid in a trench in the presence of water. All water shall be sufficiently removed from the trench prior to the line placing operation to ensure a dry, firm bed on which to place the utility line.

B. Storm and Sanitary Sewer Trenches:
   1. For pipe sizes less than 42 inches in diameter, the minimum trench width shall be outside diameter of pipe plus 18 inches.
   2. Trenches shall be excavated to a depth of at least 6 inches below the barrel of pipe.

C. Appurtenances:
   1. Any overdepth excavation below appurtenances shall be refilled with cement-stabilized sand.

D. Water Line Trenches:
   1. Water lines shall be at least two feet in depth from the top of proposed grade to the top of pipe.
   2. Trench width for water lines shall be a minimum of the outside pipe diameter plus 18 inches.
   3. Trenches shall be excavated to a depth of at least 6 inches below the barrel of pipe.

3.2 PIPE BEDDING AND BACKFILL

A. Storm and Sanitary Sewer Trenches:
   1. The cement-stabilized sand bedding shall not extend from a point 6 inches below the bottom of the pipe to the level of the spring line. This material shall not be used after it loses its moisture content.
   2. The cement-stabilized sand shall be thoroughly rodded after being placed in the trench.
   3. Bedding, sewer pipe, and initial backfill over the pipe must be placed in a single day for any given portion of pipe. Initial backfill shall be placed to one foot above the top of pipe for earth backfill and 6 inches over the top of pipe for cement-stabilized sand backfill.
   4. Remainder of trench backfill shall be placed the next day or later in 8 inch lifts.
   5. Backfill shall be placed in uniform layers not to exceed 8 inches loose depth, and compacted to a minimum of 95% of Standard Maximum Density (ASTM D698).
   6. Backfill, under pavement and to one foot from outer edge, shall b e cement-stabilized sand, up to one foot below subgrade elevation. Remainder of backfill to subgrade to be as specified in paragraph 5 above and stabilized where required.

B. Water Line Trenches:

1. Pipe bedding shall consist of 6 inches of clean sand placed before the pipe is laid.
2. After laying pipe and ensuring that the pipe is properly placed and supported by the sand bedding, clean sand backfill shall be placed to 6 inches above the top of pipe. The sand backfill shall be thoroughly rodded and tamped for compaction.
3. For water lines to be beneath the building and pavement and to one foot from the outer edge of pavement, the remainder of the trench backfill shall be clean sand placed in 6 inch lifts and compacted to 95% Standard Proctor.
4. For water lines not beneath the building and pavement or within one foot from the outer edge of pavement the remainder of the trench backfill shall be earth fill placed in uniform layers not to exceed 8" loose depth. Each lift shall be compacted to a minimum of 90% of Standard Density (ASTM D698) at the proper moisture content specified in the soils report for this project. All earth backfill shall be placed the next day or later after the pipe is laid.

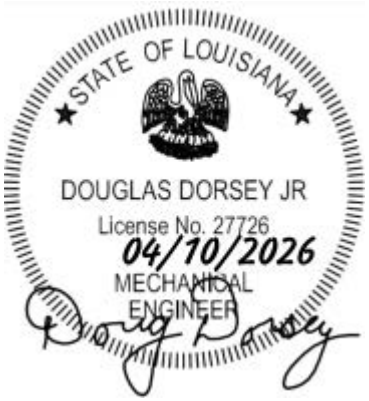
C. Natural Gas Trenches:

1. Natural gas lines shall not be installed under slabs on grade unless pipes are sleeved and vented as per Specifications.
2. Natural gas lines shall not be installed in trenches with other utilities.

D. Utility Locators:

1. Provide metallic locator over all underground utilities, including irrigation piping, plumbing, control wiring, conduit, data, etc. Locator tape shall be a maximum of 12 inches below grade and centered over the utility(s).

END OF SECTION 22 05 16



SECTION 22 05 17

PLUMBING ACCESS DOORS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish and install access doors in wall or ceiling locations as required or shown for access to valves, controls, regulating devices, water arresters and other equipment requiring maintenance, adjustment or operation.

PART 2 - PRODUCTS

2.1 NON-FIRE RATED ACCESS DOORS

A. 16-Gauge frames

B. 14-gauge steel panels

C. Continuous fully concealed hinges

D. Flush screwdriver cam lock & cylinder lock for Owner selection

E. Prime coat finish

F. Brushed satin stainless steel finish in areas with gypboard ceilings (i.e. specifically restrooms, kitchens or cafeteria installation)

G. Material suitable for wall and/or ceiling mounting

2.2 FIRE RATED ACCESS DOORS

A. UL listed, 1-1/2 hour Label “B”, access doors

B. 16-Gauge stainless steel

C. 20-Gauge insulated sandwich-type door panel.

D. Two inch thick with fire rated insulation

E. Continuous fully concealed hinge

F. Automatic closing and latching mechanism

G. Knurled knob and recessed key operation for Owner selection

H. Interior latch release slide for opening from inside

I. Prime coat finish

J. Material suitable for wall and/or ceiling mounting

2.3 ACCEPTABLE MANUFACTURERS

A. Milcor

B. MIFAB

C. Acudor

D. Elmdor

PART 3 – EXECUTION

3.1 INSTALLATION

A. Access doors specified in Division 22 will be installed by other crafts. Not all required access doors are shown. Coordinate with the Contractor to locate access doors for ease of operation and maintenance of concealed equipment.

B. Installation shall be in accordance with the manufacturer's printed instructions.

C. Minimum size required:
   1. 24" x 24" for plumbing multiple isolation valves and electrical related items in ceilings
   2. 8"x8" for plumbing for single isolation valve or shock arrestor

END OF SECTION 22 05 17

SECTION 22 05 23

VALVES, STRAINERS AND VENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Plumbing Valves

B. Pipe strainer and suction diffusers.

PART 2 - PRODUCTS

2.1 VALVES

A. Pressure Ratings:
1. Unless otherwise indicated, use valves suitable for 125 minimum psig working steam pressure
2. (WSP) and 450°F.
3. The pressure temperature rating of valves shall be not less than the design criteria applicable to
4. components of the system.

B. Butterfly Valves
1. Butterfly valves shall conform to MSS-SP67.
2. Liners, inserts and discs shall be suitable for the intended service.
3. Valves shall have a full lug type body designed for installation between ANSI standard flanges, and shall be rated at full working pressure with downstream flange removed.
4. All valves for domestic use must be lead free.

C. Balancing Valves
1. Provide balancing valves with:
   a. Corrosion resistant plug with resilient seal when required.
   b. O-ring stem seal.
   c. Permanently lubricated, corrosion resistant bearings.
2. Connections
   a. Through 2" pipe size use threaded connections.
   b. For valves 2-1/2" pipe size and larger shall be provided with 150 psig flange connections.
3. Provide each valve with:
   a. Memory stop.
   b. Plastic drip cap.
   c. 1/8" gauge tap.
4. All valves for domestic use must be lead free.

D. Ball Valves
1. Provide ball valves with:
   a. Blowout proof stem.
   b. Full size port, 316 stainless steel ball and stem.
   c. Cast bronze body.
   d. Threaded ends.
2. Seat, seals, thrust washers and packing shall be suitable for the intended service.
3. Service rating:
   a. 150 psi saturated steam.
   b. 600 psi WOG.
   c. Provide with memory stop for balancing valves.
   d. Where Viega ProPress fittings are used, Viega ProPress ball valves may be used.
   e. All valves for domestic use must be lead free.

E. Gate Valves
1. Gate valves shall be designed for repacking under pressure when fully opened. Equipped with packing suitable for the intended service.
2. When the valve is fully opened, the back seat shall protect the packing and the stem threads from the fluid.
3. All gate valves shall have a gland follower.
4. Provide solid wedge type gate valves designed and manufactured so that seating surfaces are prevented from contacting until near the point of closure.
5. Provide a malleable hand-wheel for all gate valves.
6. Provide bronze body, bronze trim, non-rising stem, hand-wheel, inside screw, single wedge or disc, threaded ends up to 2".
7. Provide iron body, bronze trim, rising stem, hand-wheel, OS&Y, double wedge, flanged ends over 2".

F. Globe and Angle Valves
1. Bronze body 2" and smaller, bronze plug disc and renewable seat ring, union bonnet, malleable iron hand wheel, standard packing with bronze gland follower.
2. Iron body 2-1/2" and larger, bronze mounted disc and bronze seat ring, outside screw and yoke, standard packing with gland follower.
3. Globe valves shall be designed for repacking under pressure when fully opened.
4. Equipped with packing suitable for the intended service.
5. When the valve is fully opened, the back seat shall protect the packing and the stem threads from the fluid.

G. Valve Connections
1. Provide valves suitable to connect to adjoining piping as specified for pipe joints. Use pipe size valves. Sweated joints are not allowed.
2. Thread pipe sizes 2" and smaller.
3. Flange pipe sizes 2-1/2" and larger.
4. Use screw to solder adapters for copper tubing.
5. Use grooved body valves with mechanical grooved jointed piping.
6. Use press valves when using copper press systems.

H. Valve Operators
1. Provide suitable hand-wheels for gate, globe, angle or drain valves and inside hose bibbs.
2. When cocks and valves are furnished with square head stem:
   a. Provide one wrench for every ten cocks or valves sized 2" and smaller, minimum of two.
   b. Provide each cock or valve size 2-1/2" and larger with a wrench with setscrew.
3. Where butterfly valves are provided:
   a. Provide gear operators on valves 6" and larger.
   b. Where valves are located 7' or more above the finished floor in equipment room areas provide chain-operated sheaves. Extend chains to about 5' above floor and hook to clips, arrange to clear walking space.
   c. Lever lock handle with toothed plate for shut-off service and infinitely adjustable handle with lock and nut and memory stop for throttling service on valves 4" and smaller.

I. Acceptable Manufacturers (All listed must be lead free):
1. Apollo
2. Crane
3. Dezurik
4. Jenkins
5. Keystone
6. Kitz
7. Milwaukee Valve
8. Nibco
9. Stockham

J. Check Valves
   1. Bronze body, 2" and smaller, bronze disc (Teflon disc for steam service), regrinding swing check, screw-in cap, threaded connection (Lead Free).
   2. Iron body, 2-1/2" and larger, bronze trim, non-slam: stainless steel pins and springs, and bronze plate or bronze mounted, regrind-renew check, bronze seat ring and disc. Provide either wafer or threaded lug (Lead Free).
   3. Acceptable Manufacturers (All listed must be lead free):
      a. Apollo
      b. Keystone
      c. Kitz
      d. Milwaukee
      e. Mission Duochek
      f. Nibco

K. Backflow Preventer (All valves for domestic use must be lead free):
   1. (2" and smaller) bronze body, reduced pressure zone type with two inline independent check valves with an intermediate relief valve, complete with two full port ball valve shut-offs and ball type test cocks. Bronze strainer on inlet. Provide air gap fitting with full size drain piped to nearest floor drain. Watts 909-QT-S-LF.
   2. (2-1/2" and larger) stainless steel or FDA epoxy coated ductile iron reduced pressure zone type with two inline independent check valves with reverse relief valves, two non-rising stem resilient sealed gate valves, cast iron strainer on inlet. Provide air gap fitting piped full size to nearest floor drain. Apollo RP4ALF-YS Watts 909-NRS-BB-S-LF.

L. Provide valves of same manufacturer throughout where possible.

M. Provide valves with manufacturer's name and manufacturing location, duty and pressure rating clearly marked on outside of body.

N. Where valves are installed in insulated piping, provide with extended neck so valve operator and stop plate clears the full thickness insulation.

O. Provide valve, seat and trim materials suitable for the intended service.

P. Provide memory stops for all valves used for throttling service. Valves for throttling service shall be butterfly, plug, globe or ball type.

Q. Float Valve
   1. On – Off non-modulating action
   2. Fully adjustable high and low level settings
   3. Float, float linkage and float rod
   4. Complete stainless steel material
   5. Level differential adjustment minimum to 18" maximum
   6. Stilling well
   7. Acceptable Manufacturer: CLA-VAL

2.2 PIPE SYSTEMS STRAINERS

A. Body:
   1. Bronze "Y" pattern or basket as shown on the drawings.
   2. Line size.
   3. Threaded strainer blow down port.
   4. ASTM A #126 Class B Cast Iron Body.

B. Construction:
   1. 2" size and smaller with screw connections rated 400 psi WOG.
   2. Over 2" size with flanged connections, rated 125 psi WOG.

C. Fabricate screens of Monel or type 304 stainless steel:
   1. With 20 mesh woven wire in piping systems through 2".
   2. With 0.045 perforations in piping systems 2-1/2" and 3".
   3. With 0.125 perforations in piping systems 4" and larger.

D. Start-up:
   1. Provide an additional fine mesh disposable screen for use during start-up operations.
   2. Remove after 30 days.
   3. Attach to piping for owners review.

E. Acceptable Manufacturers (All listed must be lead free):
   1. Apollo
   2. Crane
   3. Keckley
   4. Kitz
   5. Mueller
   6. McAlear
   7. Muesco
   8. Nibco
   9. Zurn

2.3 SUCTION DIFFUSER

A. For each pump as shown on the drawing, provide an angle type suction diffuser. Body to fit both the pump inlet and suction pipe size.

B. Components:
   1. Inlet straightening vanes.
   2. Removable end cap.
   3. Gauge ports.
   4. Threaded strainer blow down port.
   5. Adjustable support foot.
   6. Removable magnetic insert.

C. The screen shall be as specified for pipe system strainers.

D. Provide an additional fine mesh disposable strainer for use during start up operations.
   1. Remove after 30 days operation and all flushing is complete.
   2. Attach to piping for owners review.

E. Construction:
   1. 2" size and smaller with screw connections rated 400 psi WOG.
   2. Over 2" size with flanged connections, rated 125 psi WOG.

F. Fabricate screens of Monel or type 304 stainless steel:
   1. With 20 mesh woven wire in piping systems through 2".
   2. With 0.045 perforations in piping systems 2-1/2" and 3".
   3. With 0.125 perforations in piping systems 4" and larger.

2.4 VALVE SCHEDULE

A. Domestic Service
   1. Gas shut-off service: UL approved for natural gas service.
      a. Nibco Ball Valve, full port through 1": T-585-70-UL
      b. Nibco Ball Valve conventional port 1-1/4" through 3": T-580-70-UL
      c. Resun 2-1/2" and larger: 143 - 1-UL
      d. DeZurick 2-1/2" and larger: Series 425 or 435
      e. Locking Type: Rockford 3/4" and 1" PNP-400

a. Mueller 1-1/4" through 4": Lub-O-seal
f. Conbraco Ball Valve, full port through 4": 64-100 Series
g. Milwaukee Full Port ¼"-2"
h. Milwaukee Standard Port 2-1/2" & 3"
i. Kitz Full Port 2" =- #68

2. Cold and Hot water service (all listed must be Lead Free):
   a. Nibco Ball Valve full port through 2": T-585-66-LF
   b. Nibco Ball Valve 2-1/2" and 3" conventional port: T-580-66-LF
   c. Nibco Butterfly Valve 4" and larger: LD-2000 EDPM Gaskets
   d. Watts Ball Valve 4" and larger: G-4000-FDA
   e. Viega ProPress Bronze Ball Valves (where Viega ProPress fittings are used)
   f. Kitz Full Port through 2" - #868M Lead Free
   g. Milwaukee Full Port ¼"-2"
   h. Milwaukee Standard Port 2-1/2" & 3"
   i. Apollo Ball Valve Full Port through 2-1/2" 77CALF
   j. Apollo Ball Valve Standard Port 3" 70LF
   k. Apollo Butterfly Valve 4" and Larger LD141
   l. Apollo Press Bronze Ball valves – 77 WLF
3. Compressed air system
   a. Nibco Ball Valve full port through 2": T-585-70-66
   b. Nibco Ball Valve 2-1/2" and 3" conventional port: T-580-70-66
   c. Watts Ball Valve 4" and larger: G-4000
   d. Viega ProPress Bronze Ball Valves (where Viega ProPress fittings are used)
   e. Milwaukee Valve Full Port through 2" – BA-400S
   f. Apollo Ball valve full port through 1-1/2" 77CA
   g. Apollo Ball Valve standard port 3" 70
   h. Apollo Press Bronze Ball valves: 77W
4. Check Valve (All listed must be Lead Free):
   a. Nibco Check Valve: T - 413 - Y -LF (Teflon Seats)
   b. Nibco Check Valve 2-1/2" and larger: F - 918 – Y -LF (Buna-N disc.)
   c. Nibco Check Valve 2-1/2" and larger: W - 920 -W-LF (Wafer)
   d. Kitz Y & Check: A-22T
   e. Kitz 2-1/2" and Larger #778 C.I.
   f. Kitz Wafer Check 2-1/2" and Larger #7032
   g. Milwaukee Valve – 509T
   h. Apollo Check Valve: 163TLF
   i. Apollo Check Valve 2-1/2" and larger: 910FLF
   j. Apollo Press Check Valve: 163TPR-LF
   k. Apollo Check Valve 2" and larger 910WE-LF (Wafer)
5. Globe Valve:
   a. Nibco Globe Valve: T - 235 - Y (Teflon Seats)
   b. Nibco Globe Valve 2-1/2" and larger: F - 718 - B (Bronze Seats)
   c. Milwaukee Valve 590T
   d. Apollo Globe Valve – 120T (Teflon Seats)
   e. Apollo Glove Valve 121T (Bronze Seats)
6. Gate Valve
   a. Nibco Gate Valve through 2": T-133
   b. Nibco Gate Valve 2-1/2" and Larger: F-617
   c. Milwaukee Valve Through 2" 1140
   d. Milwaukee Valve 2-1/2" and Larger – F2885A
   e. Apollo Gate Valve through 2": 106T
   f. Apollo Gate Valve: 2-1/2 and Larger: 611F)

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install valves with stems upright or horizontal, not inverted.

B. Install valves for shut-off and isolating service at each piece of equipment, at vertical risers, and where shown on the drawings.

C. Use butterfly valves and ball valves in domestic hot water and domestic cold water systems interchangeable in place of gate and globe valves.

D. Use butterfly valves and ball valves in circulating water systems, for balancing duty.

E. Provide drain valves at main shut-off valves and low points of piping and apparatus so the systems can be entirely drained.
1. 1" valve for pipes 6" and larger.
2. 3/4" valve for pipes smaller than 6".
3. Terminate with pipe plug.
4. Drain valves shall be ball valves.

F. Provide isolation valves in domestic water lines to isolate all equipment, restrooms, hose bibbs, and where shown on the drawings.

G. Where valves are installed in insulated pipe, valve operator shall have an insert so the lever or handle will not damage the insulation. Install handles so the lever or handles will not damage the insulation.

H. Provide clearance for installation of insulation and access to valves.

I. Provide access panels where valves are not exposed.

J. Float valves / stilling wells provided and installed in fire / domestic water surge tanks for water level control. Stilling wells provided around float to prevent turbulence ripples or wind from interference.

3.2 VALVE TAGS

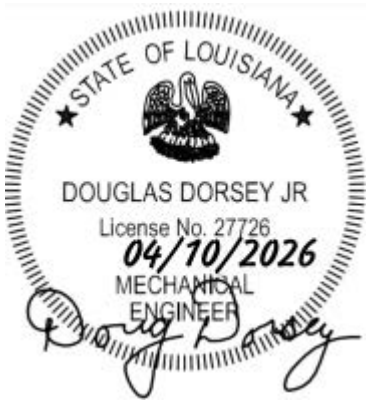
A. Furnish valves with 1-1/2" diameter brass valve tags with stamped, black or red-filled numbers. Service designations shall be 1/4" letters, and valve numbers shall be 2" letters. Engineer shall approve Service designations. Secure tags to valves by use of brass "S" hooks or brass chain. Secure chain to valve by use of copper or Monel meter seals. Valve tags are not required if the valve is located within 3' of the equipment being served and the service is obvious.

B. Mount charts and drawings listing functions of each valve and its location in a metal and glass frame. Place charts and drawings as directed; in addition, on the record drawings mark the symbols and furnish a valve schedule properly identifying the valve number, service, exact location, the material being piped, and the room number of area that the valve services. This schedule shall be furnished on reproducible drafting paper or film suitable for reproduction on an Ozalid machine. The Owner shall approve the size of drafting paper. Provide a copy of the valve chart in the Operating and Maintenance Manuals.

3.3 PIPE SYSTEMS STRAINERS

A. Provide strainers in supply piping to circulating pumps, thermostatic mixing valves, before solenoid valves and trap primer valves.

END OF SECTION 22 05 23



SECTION 22 07 19

PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish and install piping insulation, jackets, accessories and covering of specified materials. The insulation shall be used for high and low temperature piping applications including domestic hot and cold water, roof and overflow drain sump bodies and rain leaders, horizontal sanitary drain piping which receives condensate, make-up water and pool heating water.

1.2 QUALITY ASSURANCE

A. The intent of insulation specifications is to obtain superior quality workmanship resulting in an installation that is absolutely satisfactory in both function and appearance. Provide insulation in accordance with the specifications for each type of service and apply as recommended by the manufacturer and as specified.

B. An approved contractor for this work under this Division shall be:
   1. A specialist in this field and have the personnel, experience, training, skill, and the organization to provide a practical working system.
   2. Able to furnish evidence of having contracted for and installed not less than 3 systems of comparable size and type that have served their owners satisfactorily for not less than 3 years.

C. All piping insulation used on the project inside the building must have a flame spread rating not exceeding 25 and a smoke developed rating not exceeding 50, as determined by test procedures ASTM E 84, NFPA 255 and UL 723. These ratings must be as tested on the composite of insulation, jacket or facing, and adhesive. Components such as adhesives, mastics and cements must meet the same individual ratings as the minimum requirements and bear the UL label.

D. Condensation on any insulated piping system is not acceptable.

E. Replace insulation damaged by either moisture or other means. Insulation that has been wet, whether dried or not, is considered damaged. Make repairs where condensation is caused by improper installation of insulation. Also repair any damage caused by the condensation.

F. Where existing insulated piping, or other surfaces are tapped, remove existing insulation back to undamaged sections for hot surfaces or to nearest insulation stop for cold surfaces, and replace with new insulation of the same type and thickness as existing insulation. Apply as specified for insulation of the same service.

1.3 APPROVALS

A. Submit product data on each insulation type, adhesive, and finish to be used in the work. Make the submittal as specified in Division 1 General Requirements and obtain approval before beginning installation. Include product description, list of materials and thickness for each service and location and the manufacturer's installation instructions for each product.

B. Make a field application of each type of insulation to display the material, quality and application method. Obtain approval of the sample application before proceeding with installation of the work.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Glass fiber pipe insulation:
   1. Johns-Manville Micro-Lok AP-T
   2. Owens-Corning ASJ/SSL
   3. Knauf ASJ/SSL

B. Cellular Glass Insulation (Foamglass):
   1. Pittsburg Corning
   2. Cell-U-Foam

C. Aluminum Jacketing:
   1. Childers
   2. Pabco
   3. RPR

D. Fiberglass reinforcing cloth mesh:
   1. Perma Glass Mesh
   2. Alpha Glass Mesh
   3. Childers Chil-Glas
   4. Vimasco

E. Mastics and Adhesives
   1. Childers
   2. Foster
   3. Vimasco
   4. Armstrong 520 Adhesive

F. Elastomeric Insulation
   1. Armacell

G. Weather Resistant Coating
   1. WB Armaflex Finish

H. Glass fiber blanket insulation
   1. Manville R-series Microlite FSKL
   2. Owens-Corning eD75 or ED100 RKF
   3. Knauf 0.75 PCF FSK

2.2 FIBERGLASS PIPE INSULATION

A. Heavy density, dual temperature fiberglass insulation with factory applied, all service, reinforced vapor barrier jacket having integral laminated vapor barrier. Provide with a factory applied pressure sensitive tape closure system and matching butt strips. Supply in thickness as shown.
   1. Thermal conductivity 0.23 @ 75°F mean (ASTM 335).

2.3 ELASTOMERIC INSULATION

A. Insulation material shall be flexible, closed-cell elastomeric insulation in tubular or sheet form. Material shall have a flame spread rating of 25 or less and a smoke developed rating of 50 or less when tested in accordance with ASTM E84, latest revision. Sheet material with a thickness greater than ¾" shall have a flame spread rating of 25 or less and a smoke developed rating of 100 or less when tested in accordance with ASTM E84, latest revision. In addition, the product, when tested, shall not melt or drip flaming particles, and the flame shall not be progressive. In addition, all materials shall pass simulated end-use fire test. Minimum ¾" thick.
   1. Thermal conductivity 0.27 at 75°F mean (ASTM C177 or C518)

2.4 CELLULAR GLASS INSULATION

A. ASTM C552:
   1. "k" value of 0.35 @ 75°F ("ksi" value of 0.047 @ 24°C);
   2. 8.0 lb/cu.ft. (128 kg/cu.m.) density

2.5 INSULATION/SHIELD AT HANGERS

A. Field fabricated: Use 360° sections of rigid foamglass insulation that will support the bearing area at hangers and supports. Further support insulation at hangers and supports with a shield of galvanized metal covering at least half of the pipe circumference, and conforming to the schedule. Insulation shall extend at least 1" beyond metal shield on each end. When pipe is guided at top and bottom, metal shields shall cover the whole pipe circumference. Adhere metal shield to insulation so that metal will not slide with respect to insulation with ½" aluminum bands (2) per shield.
   1. Sections of foam glass insulation may be used of the same outside diameter of the adjoining pipe insulation.
   2. Minimum thickness of foam glass insulation shall not be less than 1" thick.

B. Pipe saddles: Formed galvanized sheets at each support point for insulated pipe, shaped to fit pipe, and covering bottom half of pipe. Length at saddle shall be not less than twice the insulation outside diameter or more than 22". Provide 18 gauge through 4" pipe and 16-gauge 5" pipe and above.

2.6 SEALANT, ADHESIVE AND FINISH

A. Lap Adhesive. Provide Childers CP-82 adhesive.

B. Vapor Barrier Finish:
   1. Indoors: Provide as insulation coating Childers CP-35, white.
   2. Outdoors: Provide as insulation coating Childers Encacel X.
   3. Underground: Provide Childers CP-22/24 for fittings and areas. Pittwrap cannot be used.

C. Sealant. Provide Childers CP-76 vapor barrier sealant.

D. Lagging Adhesive. Provide Childers CP-50.

E. Other products of equal quality will be acceptable only upon approval.

2.7 ALUMINUM JACKETING

A. Finish insulated piping outdoors with a smooth prefabricated Z-lock aluminum jacket 0.016" thick with factory applied 1 mil polyethylene/40 lb and Fab strap. Kraft moisture barrier. Childers Lock-On or approved equal.

B. Valves, Fittings and Flanges. For finishing valves, fittings, flanges and similar installations, provide formed aluminum covers, 0.024" thick.

C. Straps and Seals. Provide ½" x 0.020 stainless steel strapping and seals for jackets and covers according to manufacturer's recommendations.

2.8 GLASS FIBER BLANKET INSULATION

A. Minimum density of 1.0 PCF, 2" thick, installed R value to be 6.0 or better at 75°F mean, facing of 0.35 mil foil reinforced with glass yarn mesh and laminated to 40 lbs fire resistant

PART 3 - EXECUTION

3.1 INTERIOR PIPING

A. Cover all piping with glass fiber, heavy density, dual temperature pipe insulation with a vapor barrier jacket. Apply insulation to clean, dry pipes. Longitudinal seams shall be joined firmly together and sealed with self-sealing lap joints. Butt insulation joints firmly together and seal with a 3" wide ASJ butt strip seal. Longitudinal seams and butt strip laps shall be coated and sealed with CP-35 vapor barrier coating for chilled water piping applications.

B. Install hanger with protective shield, on the outside of all insulation.

C. Where domestic water pipes (1/2" & ¾" pipe sizes) are installed on trapeze type hangers, provide galvanized sheet metal protection shields at these locations. Place insulation jacket directly on hanger. Incompressible, load bearing insulation segments are not required.

D. Pipe Saddles: Formed galvanized sheets at each support point for insulated pipe, shaped to fit pipe, and covering bottom half of pipe. Length at saddle shall be not less than twice the insulation outside diameter. Provide 18-gauge through 4" pipe and 16-gauge for 5" pipe and above.

E. Seal ends of pipe for drinking chilled water insulation with vapor barrier mastic at valves, flanges, fittings and every 21' on straight runs of piping. Mastic should extend on top of ASJ jacket, across the glass, down onto the pipe making a complete seal.

F. Apply a smooth flood coat of white lagging Foster 8142W over all exposed insulation.

G. PIPING LOCATED AND EXPOSED IN MECHANICAL AND PUMP AND BOILER ROOMS shall have entire installation covered with 0.02" thick, industry standard color-coded PVC covering and fittings.

H. Piping to be insulated as specified above:
   1. All hot and cold water.
   2. Make-up water
   3. Horizontal sanitary drain piping that receives condensate
   4. Exposed to view storm drainage system including roof and overflow drain bodies, vertical piping from drain body and all horizontal rain leaders to first elbow turning down.

3.2 PIPING OUTDOORS ABOVE GRADE

A. Insulate all water piping exterior of building above grade with rigid foam insulation and aluminum jacketing.

B. Adhere the vapor barrier jacket longitudinal seam with vapor barrier adhesive.

C. Cover all valves, fittings and flanges with factory made molded or field fabricated segments of pipe insulation of a thickness and material equal to the adjoining insulation. Adhere segments together with no voids, using CP-82 adhesive. Secure fitting insulation covers and segments in place with ½" wide glass filament tape.

D. Apply a tack coat of fitting mastic over the insulation and tape.

E. Neatly embed with 10 x 10 fiberglass cloth into the tack coat.

F. Apply mastic over the fiberglass cloth to a thickness where the fabric is not visible after completion.

G. Seal ends of pipe insulation with vapor barrier mastic at valves, flanges, fittings and every 21' on straight runs of piping. Mastic should extend on top of ASJ jacket, across the foam, down onto the pipe, making a complete seal.

H. Finish with aluminum jacketing as specified.

3.3 FLANGE, VALVE AND FITTING INSULATION

A. Cover valves and flanges with fabricated segments, fittings with two-piece factory molded fittings, and both

of matching pipe insulation type and thickness equal to that of the adjoining pipe. Fittings and fabricated segments shall be securely held in place.

1. Apply a tack coat of insulating mastic to the insulated fitting to produce a smooth surface.
2. After mastic is dry, apply a second coat of vapor barrier mastic. Neatly embed with 10 x 10 fiberglass cloth into the tack coat.
3. Overlap mastic and fiberglass cloth by 2" on adjoining sections of pipe insulation.
4. Apply a second coat of mastic over the fiberglass cloth to present a smooth surface.
5. Apply mastic to a wet film thickness of 3/64".
6. Fabric shall not be visible after completion.
7. Vapor seal flanges, valves and fittings with Childers CP-35.

B. PVC fitting covers are not acceptable.

3.4 ALUMINUM JACKETING (Insulated Piping Outdoors Above Grade)

A. Apply smooth aluminum jacket on piping, valves, fittings and flange covers according to manufacturer's recommendations, using stainless steel strapping and seals, to provide weather tight covering and to shed water.

B. Aluminum jacketing is not considered as contributing to the vapor barrier or the insulation jacket. The vapor barrier must be sufficient in itself for this function. Lap each adjoining jacket section a minimum of 3" to make a weather tight seal.

C. Install straps on 9" centers and at each circumferential lap joint.

D. Cover and seal all exposed surfaces.

E. The use of screws and rivets is not approved.

F. Provide isolation (30# felt) between the aluminum jacket and the sheetmetal protection shield at each pipe support point.

3.5 CONCEALED STORM DRAIN PIPING

A. Provide flexible glass fiber insulation with factory-applied, reinforced UL labeled Foil-Skrim-Kraft (FSK) facing. Install insulation of clean, dry piping.

B. Insulation shall be wrapped tightly on the piping with all circumferential joints and longitudinal joints overlapped a minimum of 2" with facing to the outside to obtain specified R-value using a maximum of 25% compression.

C. Provide vapor retarder at penetrations, joints, seams and damage to the facing with staples and FSK foil tape. The facing shall be taped with a minimum 3" wide strip of reinforced foil tape. Pressure-sensitive tape shall be a minimum 3" (76mm) wide and shall be applied with moving pressure using an appropriate sealing tool. Staples shall be outward cinch and placed 6" (152mm) on center.

D. Mechanical / Electrical rooms and above ceilings are considered concealed spaces.

3.6 MISCELLANEOUS

A. Install materials after piping has been tested and approved.

B. Apply insulation on clean, dry surfaces only.

C. Apply weather protective finish on elastomeric insulation installed in non-conditioned spaces. Provide a minimum of three coats.

3.7 INSULATION THICKNESS

INSULATED UNIT	THICKNESS (Inches)
Exposed Roof Drain Bodies and Horizontal Roof Drain Leaders	1-1/2
Exposed Roof Overflow Drain Bodies and Horizontal Drain Leaders	1-1/2
Domestic Cold Water/Make-Up Water Piping/Drinking Chilled Water	1
Horizontal Sanitary Drain Piping Which Receives Condensate	1
Condensate Drain Piping	1"
Domestic Hot Water Piping, 1-1/2" Pipe and Smaller	1
Domestic Hot Water Piping, 2" Pipe and Larger	1-1/2

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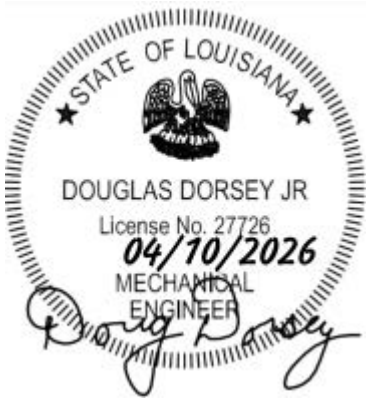


SECTION 22 11 16

DOMESTIC WATER PIPING AND APPURTENANCES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish and install domestic hot and cold water piping.

1.2 RELATED WORK

A. Division 22 Plumbing
   1. Valves, Strainers and Vents
   2. Pipe and Pipe Fittings - General
   3. Plumbing Piping Insulation
   4. Plumbing Fixtures and Fixture Carriers

PART 2 - PRODUCTS

2.1 PIPING AND FITTINGS

A. Below Slab on Grade Piping for Water Entries:
   1. 2-inch and smaller, provide ASTM B88 Type K (heavy wall) annealed tempered (soft) seamless copper water tube. No joints below slab entries.
   2. 2-1/2-inch and 3-inch, provide ASTM B88 Type K (heavy wall) annealed tempered (soft) seamless copper water tube, 20 ft. straight lengths. One joint allowed below slab entry using wrought copper, solder-joint pressure fittings: ASME B16.22 with an approved brazing filler metal or pipe can be shop bent for no joint installation by using a “bending” temper tubing.
   3. 4-inch and larger, provide ductile iron pipe with mechanical joints, ANSI A21.6.
   4. 3 inch and larger, provide one-piece stainless steel IBR (in building riser), Watts or Ames.

B. Below Grade Piping Outside Building (beyond 5’-0” of building): Provide PVC water main pipe 4 inch through 12 inch in diameter in conformance with AWWA C900. When using 3” or smaller provide Schedule 40 PVC ASTM D1785 with ASTM D-2466 socket type fittings. Provide fittings in conformance with ASTM 2466. Furnish pipe with a minimum pressure rating of 150 lbs. per square inch. Provide PVC pipe as manufactured by Johns-Manville, CertainTeed, Clow or approved equal.

C. Below Slab on Grade Piping. Furnish ASTM B 88 and ANSI/NSF Standard 61 annealed tempered (soft), Type K copper water tube. Run continuous with no joints under the floor slab. Provide copper pipe corrosion protection as specified in this Section.

D. Above Slab Piping. Provide seamless ASTM B 88 and ANSI/NSF Standard 61 drawn tempered (hard) Type L copper water tube with wrought copper or bronze fittings with solder-joints, ANSI B16.22. Solder material shall be 95-5 (lead free) (Tin-Antimony-Grade 95TA) ASTM B 32.

E. Unions. Provide 150 lb. standard unions with ground joint and bronze seat. Flange joints larger than 2 inches. Provide dielectric isolating unions at junctions or connection between metallic piping of dissimilar metal. Provide pipe threads with standard taper pipe threads ANSI B2.1.

F. Alternate Method of Joining Copper Pipe and Tubing: Press Fittings: Copper press fitting shall conform to the material and sizing requirements of ASME B16.51. O-rings for copper press fittings shall be EPDM. VIEGA. The system intended for use shall be approved by submittal. Systems from various manufacturers may vary in technology. The field personnel shall carry training credentials from the approved manufacturer for the project. Mixing of fittings from different manufacturers is strictly prohibited.

2.2 WATER HAMMER ARRESTORS

A. Provide piston type hydraulic engineered/manufactured water hammer arrestors in cold and hot water supply lines in chases or walls to each fixture branch or battery of fixtures serving quick closing valves of electrical, pneumatic, spring loaded type, or quick hand closure valves on fixture trim. Provide water hammer arrestors at the end of the branch line between the last two fixtures served. Provide Precision Plumbing Products, Inc., or equal. Size units according to water hammer arrestor's Standard PDI WH-201; refer to schedule on drawings.

B. Install all water hammer arrestors so as to attain 100% effectiveness according to Plumbing and Drainage Institute PDI-WH201 Table 5, 6 and 6-A for water hammer arrestors.

C. All water hammer arrestors shall be installed in a vertical position.

D. All water hammer arrestors shall be accessible and shall have access panels where required. Arrestors located above ceilings in fixture drops will not be acceptable. Refer to sizing and placement data as indicated in PDI Standard PDI-WH-201.

PART 3 - EXECUTION

3.1 DRAINAGE

A. Install water piping systems with uniform horizontal grade of 1/8 inch per 10 foot, minimum, to low points to provide complete system drainage. Where constant pitch cannot be maintained for long runs, establish intermediate low points and rise to new level. Grade branches to drain to mains or risers. Unless otherwise indicated, terminate low points of risers with drain valve piped to nearest hub or floor drain.

3.2 STERILIZATION

A. Sterilize the water system with solution containing not less than 50PPM available chlorine. Allow chlorinating solution to remain in system for period of 8 hours (minimum). Have valves and faucets opened and closed several times during the period. After sterilization, flush the solution from the system with clean water until residual chlorine content is less than 0.2 parts per million.

3.3 UNDERGROUND WATER PIPING SYSTEM PROCEDURES

A. Lay sewer and water lines in separate trenches, separated by 10 foot of undisturbed or compacted soil.

3.4 TESTING

A. Test under a cold water hydrostatic pressure of 1-1/2 times operating pressure (150 psig minimum) and carefully check for leaks. Repair leaks and retest system until proven watertight.

B. Test the domestic water piping system at 150psig hydrostatic pressure, maintained for 6 hours.

C. Use only potable water for the test.

D. Perform the test before fixtures, faucets, trim or final connections are made to equipment.

E. If the system is tested in sections, the entire domestic water piping system shall be submitted to a final test, employing the specified procedure.

F. Do not insulate or conceal piping systems until tests are satisfactorily complete.

G. If any leaks or other defects are observed, suspend the test and correct the condition at once. Repeat testing until leaks are eliminated and the full test period is achieved.

H. The satisfactory completion of testing does not relieve the Contractor of responsibility for ultimate proper and

satisfactory operation of piping systems and their accessories.

3.5 COPPER PIPE CORROSION PROTECTION

A. Corrosion protect copper tube piping systems:
   1. In the building slab.
   2. Beneath the building slab.
   3. Buried.
   4. Route plasti-sleeve 0.006 thick material entire length of below slab on grade copper tubing.

B. Cover copper tubing piping system with:
   1. "Tapecoat" TC Primer.
   2. "Tapecoat" CT cold applied coating tape.

C. Install coating system as specified by the manufacturer.

D. Extend the corrosion protection 2 inches above concrete slab on grade.

3.6 TEST OF PIPE CORROSION PROTECTION SYSTEM

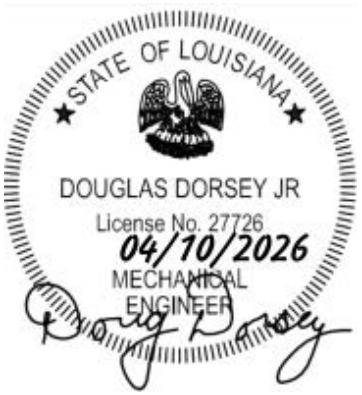
A. Test the pipe corrosion protection coating with an approved high voltage tester adjusted to provide sufficient voltage to produce a spark through a pinhole in the coating (at least 15 kv AC).

B. Make repairs to small holes in accordance with the manufacturer's instructions.

C. Retest the repairs using procedures listed above.

D. Furnish certificate of compliance with field testing in Owner's manual.

END OF SECTION 22 11 16



SECTION 22 13 16

SOIL, WASTE AND SANITARY DRAIN PIPING, VENT PIPING AND APPURTENANCES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish and install piping in buildings and underground laterals to 5 foot outside of building.

B. Only SOLID Core PVC is acceptable. Cellular Core PVC pipe is not permitted.

1.2 RELATED WORK

A. Site Work:
   1. Sanitary Sewers
   2. Excavation, Trenching and Backfilling for Utilities

B. Division 22 Plumbing:
   1. Pipe and Pipe Fittings
   2. Plumbing Fixtures and Fixture Carriers
   3. Drains, Cleanouts and Hydrants
   4. Earthwork
   5. Plumbing Piping Insulation

1.3 REFERENCES

A. CISPI - Cast Iron Soil Pipe Institute

B. ASTM - American Society for Testing and Materials

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. All No-Hub clamps must have 4 bands minimum. Sizes 5" through 10" shall have six bands minimum.
   1. No-Hub Clamps – Sanitary Waste:
      a. Husky SD 4000
   2. No-Hub Clamps - Vents
      a. Husky SD – 2000
      b. Mission Rubber Co., LLC Heavy Weight Couplings
   3. Clamp-All Hi-TorQ 80 or approved equal

B. Provide Fernco "Pro-flex" shielded couplings Series 3000 with one piece neoprene gasket for all cast iron pipe transitions to Schedule 40 DWV pipe penetrations through slabs. Sizes 1-1/2" through 8" Series 3000.

C. Cast Iron Soil Pipe and Fittings:
   1. AB&I
   2. Charlotte Pipe and Foundry Co.
   3. Tyler Pipe / Soil Division

2.2 DRAIN PIPE AND FITTINGS

A. Above Slab Piping:
   1. Schedule 40 PVC plastic pipe and DWV fittings with solvent welded joints.
   2. Pipe and fittings shall conform to ASTM D 1784-82.
   3. Provide with fire barrier plenum wrap in return air plenums.

B. Below Slab on Grade Piping:
   1. Schedule 40 PVC plastic pipe and DWV fittings.
   2. Solvent welded DWV joints shall conform to IAPMO Installation Standard IS-9.
   3. Pipe and fittings shall conform to ASTM D 1784, ASTM D 1785, ASTM D 2665, ASTM D 3311 and NPS Standard 14 & 61.

2.3 VENT PIPE AND FITTINGS

A. Above Slab Piping. Provide Schedule 40 PVC plastic pipe and DWV fittings with solvent welded joints. Pipe and fittings shall conform to ASTM D 1784-82. Provide with fire barrier plenum wrap in return air plenums.

B. Below Slab on Grade Piping:
   1. Provide Schedule 40 PVC with DWV fittings with solvent welded joints. Pipe and fittings shall conform to ASTM D1784-82.

C. Above Slab Pipe.
   1. Drainage-waste-vent copper pipe and fittings for waste stub-outs for all fixture locations.

PART 3 - EXECUTION

3.1 INSTALLATION

A. All above and below slab soil, waste, sanitary drain and vent piping installation methods shall be in accordance with Cast Iron Soil Pipe Institute Standards.

B. Above ground installation in the horizontal position shall be supported at every hub (hub & spigot or hubless type). Hangers are to be placed within 18" of hub or coupling. For large diameter fittings, 5 inches and larger shall be braced to prevent horizontal movement. Every branch opening or change of direction, braces, blocks, rodding or other suitable method shall be used to prevent movement. Riser clamps to be used for each floor, not to exceed 15'-0".

C. All above and below slab PVC sanitary waste and vent piping installation methods shall be in accordance with IAPMO Installation Standard 18-9 for Schedule 40 PVC-DWV, per manufacturer's recommendations and applicable standards.

D. Tracer wires shall be installed on all underground PVC sanitary sewer lines installed outside the building slab.

E. All PVC underground shall be installed in accordance with ASTM D2321.

3.2 GRADE

A. Give horizontal pipe grade of ¼-inch per foot where possible, but not less than 1/8 inch per foot unless otherwise shown.

3.3 DRAIN PIPE AND FITTINGS

A. Offsets and Fittings.
   1. Use reduction fittings to connect two pipes of different diameter.
   2. Change directions by appropriate use of 45-degree wyes, long-sweep quarter-bends, and sixth-, eights-, and sixteenth-bends. Sanitary tees can be used on vertical stacks. Use long sweeps at the base of risers.
   3. Provide a separate trap at each fixture, unless a trap is built into the fixture. Provide a deep seal trap at each floor drain and hub drain. Place traps so that the discharge from any fixture will pass through only one trap before reaching a building drain.

B. Hub Drains. Install hub drains where indicated, with the top of the hub 1/2 above the finished floor, unless otherwise indicated on the drawings.

C. Cleanouts. Install cleanouts the same size as the soil waste lines in which the cleanouts are placed; however, no cleanout should be larger than 4 inches in diameter.
   1. Where cleanouts occur in pipe chases, bring the cleanouts through the walls and install covers. Where cleanouts occur in floor slabs, set flush. Reference drawing schedule.
   2. Provide cleanouts where soil lines change direction, every 50 foot on long runs, or as shown on the drawings, at the end of each horizontal waste line, and at the base of each riser (and at each increase in pipe size).
   3. Cleanouts shall occur at the end of each battery of water closets, urinals, lavatories, sinks, and single water closets. Cleanouts shall be installed so as to access the main sanitary or soil line. Extend and offset above flood rim of water closet.
   4. Double sanitary tees and double quarter bends do not allow for easy access to main lines, therefore these types of fittings are not allowed.

D. Floor Drains. Locate floor drains 1/2-inch below finish floor elevation unless otherwise shown.

3.4 VENT PIPING

A. Make vent connections to vent stacks with inverted wye fittings. Extend full-size vents through the roof to at least 6 inches above the roof.

B. Flash the roof penetration with 6 lb. lead flashing approximately 24 inches square. Flange the flashing to the lead sleeve. Extend the flashing up and around the vent pipe. Turn the flashing down inside the pipe at least 2 inches to make a watertight joint. Flashing shall comply with the roofing manufacturer's requirements. Reference the Architectural Drawings for exact requirements.

C. Locate vent piping through roof a minimum horizontal distance of not less than 20 feet from any air intake opening or supply fan.

3.5 TESTING

A. Below Slab on Grade and All Floors in Multi-Story Buildings:
   1. Test pipe below slab on grade before backfilling and connecting to city sewers.
   2. Maintain not less than 10 foot of hydrostatic head for1 hour without a leak.
   3. Before acceptance of the work the contractor must ensure the piping is in working order before and after the slab is poured. To ensure this the contractor must test completed systems in the presence of the Architect, Engineer and authorities having jurisdiction after installation is complete.
   4. Maintain the test on the system till after the slab is poured. Provide an accessible connection that may be reviewed by Architect, Engineer and authorities having jurisdiction prior to and after the slab is poured.
   5. Test drainage piping systems in accordance with governing codes and the requirements specified. Provide equipment and materials and make test connections required to execute tests.
   6. Test drainage and waste piping hydraulically by filling system to its highest point or, whichever is greater, at a static head of 10 feet. Leaks at any joint shall be sufficient cause for rejection.
   7. Air tests may be substituted for hydraulic tests by forcing air into the closed system at a uniform pressure sufficient to balance a column of 10 inch hg in height.
   8. Under any of the previously described tests, the water height shall remain constant, after stabilization, for not less than 15 minutes without any further addition of water.

B. System Test. After the various sections of soil, waste and vent piping are installed, but before fixtures are connected, test the system by:
   1. Plugging outlets.
   2. Filling vertical sections of multiple story buildings of not less than three floors at a time with water. Provide wyes as required to facilitate plugging.
   3. Test for 6 hours without any drop in the water level.

3.6 RODDING SEWERS

A. All sanitary soil and waste lines, both in the building and out, shall be rodded out and flushed out after completion of construction and prior to finish floor being installed. All work must be completed prior to substantial completion. All floor drains and cleanout locations must be included in this work.

B. All sanitary soil and waste lines below building 3" and larger shall be internally videotaped at time of substantial completion. All videotaping shall include on-screen date and time, and include audio narration. All videotaping shall be provided by experienced individual in videotaping piping systems. An Owner's Representative shall be present during video-taping. Three copies of the videotape shall be delivered to the Owner for future records.

C. This work shall be done in the presence of the Owner's Representative, as part of the Contract, to ensure all lines are clear, and any obstruction that may be discovered shall be removed immediately. Rodding shall be accomplished by utilizing the proper rotary head to clear sewer. Pipe sizes 8 inches and larger shall be hydro-flushed.

3.7 SMOKE TESTING

A. Interior Plumbing Piping:
   1. Contractor shall perform smoke testing on all interior sanitary sewer piping and sanitary vent piping above and below floor prior to cover-up..
   2. Artificially created smoke used must be a persistent white tracer smoke and produced by thermogenic chemical reaction. All smoke candles or smoke pencils to be used must be non-toxic and EPA approved. Provided by Superior Signal Smoke Candles.
   3. All plumbing fixtures must be installed including floor drains with wetted trap seals.
   4. Smoke testing shall be performed after completion of any videotaping, rodding or flushing of the sanitary system. Test must be performed prior to ceiling installation in new construction projects. Smoke is usually injected into the building through the two-way cleanout in the main sewer line leaving the building or a plumbing roof vent or fixture. Smoke will travel through the sanitary sewer and vent system and through the air spaces in the sewer lines and emanate from any leaks in the system. The smoke must reach the last roof vent in the system to indicate the entire system has been completely filled with smoke. The smoke must travel the full length of the piping system. Contractor must provide manpower as necessary to visually trace the flow of smoke through the wall cavities, annular floor/ceiling spaces, inject the smoke, observe the roof vents and to identify the integrity problems.
   5. Contractor shall provide a detailed list of findings and a drawing indicating the location, fixture type, type and size of pipe, and or description of type of problems found.
   6. Typical findings from indoor smoke testing may include:
      a. Dry traps in floor drains
      b. Improperly capped sewer lines or vents
      c. Broken sewer lines or vents
      d. Cross connected sewer vents and drains
      e. The drawing of air emanating from sewer vents into intakes of air exchange systems
      f. Poorly glued pipe joints
      g. Loose no-hub couplings
   7. An Owner's Representative shall be present during smoke testing.

END OF SECTION 22 13 16

SECTION 22 20 00

PLUMBING PIPE AND PIPE FITTINGS - GENERAL

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish and install pipe and pipe fittings for piping systems specified in Division 22 - Plumbing.

1.2 RELATED WORK

A. Division 22 Plumbing
   1. Earthwork
   2. Valves, Strainers and Vents
   3. Insulation
   4. Other Piping Sections

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

A. The particular type of pipe and fittings for each system is specified in the individual sections.

2.2 JOINTS

A. Make screwed joints using machine cut USASI taper pipe threads. Apply a suitable joint compound to the male threads only. Ream the pipe to full inside diameter after cutting. All-thread nipples are not permitted.

B. Dissimilar Metals. Make joints between copper and steel pipe and equipment using insulating unions or couplings such as Crane Company #1259; EPCO as manufactured by EPCO Sales, Inc.; or an approved equal.

C. Solder joints.
   1. Prior to making joints, cut pipe square and ream to full inside diameter. Clean exterior of pipe and socket. Apply a thin coat of suitable fluxing compound to both pipe and socket, and fit parts together immediately.
   2. Heat assembled joint only as required to cause the solder to flow. Run the joint full, slightly beaded on the outside, and wipe to remove excess solder.
   3. Use silver brazing alloy or Sil-Fos on underground water entry piping. Use lead free solder on all other copper piping.

D. Make welded joints as recommended by the standards of the American Welding Society. Ensure complete penetration of deposited metal with base metal. Provide filler metal suitable for use with base metal. Keep inside of fittings free from globules of weld metal. The use of mitered joints is not approved.

E. Flanged.
   1. Prior to installation of bolts, center and align flanged joints to prevent mechanical pre-stressing of flanges, pipe or equipment. Align bolt holes to straddle the vertical, horizontal or north-south centerline. Do not exceed 3/64" per foot inclination of the flange face from true alignment.
   2. Use flat-face companion flanges only with flat-faced fittings, valves or equipment. Otherwise, use raised-face flanges.
   3. Install gaskets suitable for the intended service and factory cut to proper dimensions. Secure with manufacturers recommended gasket cement.
   4. Use ANSI nuts and bolts, galvanized or black to match flange material. Use ANSI 316 stainless steel nuts and bolts underground. Tighten bolts progressively to prevent unbalanced stress. Draw bolts tight to ensure proper seating of gaskets.

5. Use carbon steel flanges conforming to ANSI B16.5 with pipe materials conforming to ASTM A 105 Grade II or ASTM A 108, Grade II, ASTM A 53, Grade B. Use slip-on type flanges on pipe only. Use welding neck type flanges on all fittings. Weld slip-on flanges inside and outside.
6. Keep flange covers on equipment while fabricating piping. Remove when ready to install in system.

F. No Hub. Hubless joints shall be made with wide body, neoprene sealing sleeve with stainless steel sleeve, coupling joints conforming to ASTM C 1277.
1. 4" pipe size and smaller coupling housing minimum of 3" width; 24 gauge Series 300 stainless steel with hi-torque clamps; neoprene coupling gasket.
2. 6" through 10" pipe size coupling housing minimum of 4" width.
3. Tighten clamps to within manufacturer's tolerances using preset torque wrench.

G. Mechanical Joints. Provide a stuffing box type mechanical joint adapted to use gasket, cast iron gland and bolts. Coat bolts with bitumastic enamel. Use joint parts similar in design to one of the following:
1. Doublex Simplex Joint manufactured by the American Cast Iron Pipe Company, Birmingham, Alabama.
2. U.S. joints manufactured by the United States Pipe and Foundry Company, Burlington, New Jersey.
3. Boltite Joint manufactured by the McWane Cast Iron Pipe Company, Birmingham, Alabama.
4. Flexlamp manufactured by the National Cast Iron Pipe Company, Birmingham, Alabama.

H. Compression Joints for Cast Iron Water Pipe. Use Beltite, Tyton or Grip-Tite compression joints. Install in accordance with the manufacturer's recommendations for compression joints. Provide adequate concrete thrust blocks at changes of direction, as recommended by the manufacturer.

I. Compression Gasket System. Bell and spigot cast iron pipe 4" and smaller, use flax-base lubricant, Tyler Ty-Seal Lubricant or Charlotte Regular Lubricant. 6" and larger use a neoprene base lubricant, Charlotte Adhesive Lubricant.

J. Ring-Tite Joints: Furnish joints for installation according to manufacturer's recommendations. Provide adequate concrete thrust blocks at changes in direction, as recommended by manufacturer.

K. Ball Joints. Where shown, provide flexible ball joints, made of carbon steel. Ball joints must have 15° of angular flexibility. Use welded or flanged ends, as required. Furnish with 11N gaskets.

L. Mechanically Formed Tee Fitting. Mechanically extracted collars shall be formed in a continuous operation consisting of drilling a pilot hole and drawing out the tube surface to form a collar having a height not less than three (3) times the thickness of the branch wall. The branch tube shall be notched to conform with the inner curve of the run tube and shall have two (2) dimple / depth stops to insure that penetration of the branch tube into the collar is of sufficient depth for brazing and that the branch tube does not obstruct the flow in the main line tube. Dimple depth stops shall be in line with the run tube. The second dimple shall be one quarter (1/4) inch above the first and shall serve as a visual point of observation. All joints shall be brazed with silver brazing alloy or Sil-Fos. Soft soldered joints shall not be allowed.

M. Press fittings for copper pipe 1/2" to 4": Copper press fittings shall conform to the material and sizing requirements of ASTM B16.18 or ASME B16.22. O-rings for copper press fittings shall be EPDM. Pro-Press System manufactured by VIEGA. The system intended for use shall be approved by submittal. Systems from various manufacturers may vary in technology. The field personnel shall carry training credentials from the approved manufacturer for the project. Mixing of fittings from different manufacturers is strictly prohibited.

2.3 UNIONS

A. Use 150 lb. standard (300 lb. WOG) malleable iron, ground joint unions with bronze seat. Provide flanged joints on piping 2-1/2" and larger.
1. Where pipe materials of different types join, use a dielectric union. Union shall be threaded,

solder or as required for its intended use.

2.4 BRANCH CONNECTIONS

A. Pipe 2" and Smaller. For threaded piping, use straight size reducing tee. When branch is smaller than header, a nipple and reducing coupling or swagged nipple may be used.

B. 2-1/2" through 36": For welding piping, when branch size is the same as header size, use welding tee. Use Weld-o-let when branch is smaller than header. For threaded branch connections, use 3000 lb. full coupling or Thread-o-let welded to header.

2.5 GASKETS

A. High Temperature Piping. Provide 1/16" thick ring gaskets of aramid reinforced SBR such as Garlock #3200 or 3400 or equal by Advanced Products and Systems.

B. Other Piping. Provide ring rubber gaskets, Garlock #7992 or equal by Advanced Products and Systems. Use 1/8" thick cloth reinforced neoprene gaskets. For smaller than 6", use 1/16" thick gasket.

2.6 FLOORS AND CEILING PLATES

A. Provide chrome-plated floor and ceiling plates around pipes exposed to view when passing through walls, floors, partitions, or ceilings in finished areas; size plates to fit pipe or insulation and lock in place.

2.7 DOMESTIC MANUFACTURE

A. All piping material, pipe and pipe fittings shall be manufactured in the United States of America unless specifically named in these specifications.

PART 3 - EXECUTION

3.1 PIPE FABRICATION AND INSTALLATION

A. Make piping layout and installation in the most advantageous manner possible with respect to headroom, valve access, opening and equipment clearance, and clearance for other work. Give particular attention to piping in the vicinity of equipment. Preserve the required minimum access clearances to various equipment parts, as recommended by the equipment manufactured, for maintenance.

B. Cut all pipes to measurement determined at the site. After cutting pipe, remove burrs by reaming. Bevel plain ends of ferrous pipe.

C. Install piping neatly, free from unnecessary traps and pockets. Work into place without springing or forcing. Use fittings to make changes in direction. Field bending and mitering is prohibited. Make connections to equipment using flanged joints, unions or couplings. Make reducing connections with reducing fittings only.

D. Install piping without tapping out of the bottom of pipe.

E. Press Connections: Copper and steel press fittings ½” through 4” shall be applied in accordance with the manufacturer’s installation instructions. The tubing/pipe shall be fully inserted into the fitting and the tubing/pipe marked at the shoulder of the fitting. The fitting alignment shall be checked against the mark on the tubing/pipe to assure the tubing/pipe is fully engaged (inserted) in the fitting. The joints shall be pressed using the tool approved by the manufacturer. If soldering (thread adapters, etc.) near press fittings, take precautions to not damage the O-ring fittings. Maintain three pipe diameters or use a cooling agent. Viega-“Pro-Press”.

3.2 WELD

A. Weld and fabricate piping in accordance with ANSI Standard B31.1, latest edition, Code for Pressure Piping.

B. Align piping and equipment so that no part is offset more than 1/16". Set fittings and joints square and true, and preserve alignment during welding operation. Use of alignment rods inside pipe is prohibited.

C. Do not permit any weld to project within the pipe so as to restrict flows. Tack welds, if used, must be of the same material and made by the same procedure as the completed weld. Otherwise, remove tack welds during welding operation.

D. Do not split, bend, flatten or otherwise damage piping before, during or after installation.

E. Remove dirt, scale and other foreign matter from inside piping before tying into existing piping sections, fittings, valves or equipment.

F. Bevel ends of ferrous pipe.

3.3 OFFSETS AND FITTINGS

A. Due to the small scale of drawings, the indication of offsets and fittings is not possible. Investigate the structural and finish conditions affecting the work and take steps required to meet these conditions.

B. Install pipe close to walls, ceilings and columns so pipe will occupy minimum space. Provide proper spacing for insulation coverings, removal of pipe, special clearances, and offsets and fittings.

3.4 SECURING AND SUPPORTING

A. Support piping to maintain line and grade, with provision for expansion and contraction. Use approved clevis-type or trapeze-type hangers connected to structural members of the building. Single pipe runs to be supported by approved clevis type hangers. Multiple pipe runs to be supported by approved trapeze type hangers. Do not support piping from other piping or structural joist bridging.

B. Provide supports both sides of elbows for pipe 6" and larger.

C. Support vertical risers with steel strap pipe clamps of approved design and size, supported at each floor. Support piping assemblies in chases so they are rigid and self-supported before the chase is closed. Provide structural support for piping penetrating chase walls to fixtures. On cold water pipe, supports shall be outside the insulation.

D. Where insulation occurs, design hangers to protect insulation from damage. Pipe saddles and insulation shields, where required, are specified in the appropriate insulation section and are sized in accordance with the schedule on the drawings.

E. Install trapeze hangers, properly sized, to support the intended load without distortion.

F. Use electro-galvanized or zinc plated threaded rods, nuts, washers and hangers.

G. At outdoor locations, all supports, brackets and structural members shall be hot-dipped galvanized.

H. Support spacing: As recommended by the project structural engineer and support manufacturer, but not more than listed below. Not to exceed spacing requirements of smallest pipe.

Pipe Size	Copper & Steel Max. Support Spacing, Feet	Cast Iron Max. Support Spacing, Ft.	Minimum Rod Diameter, Inches
1" & smaller	6		3/8
1-1/4" & 1-1/2"	8	5	3/8
2"	10	5	3/8
3"	10	5	1/2
4" & 5"	10	5	5/8
6" and above	10	5	3/4

3.5 PIPE SUPPORTS

A. Provide P1001 or P 5000 Unistrut metal framing members and appurtenances for pipe support. Hot-dip galvanize members and appurtenances when located outside. Sagging of pipes or supports is not acceptable.

B. Adjustable clevis hangers shall be used for single pipe supports; Anvil Fig. 260. When oversized clevis is used, a nipple shall be placed over the clevis bolt as a spacer to assure that the lower U-strap will not move in on the bolt. Provide adjustable clevis with a nut / washer above and below the hanger on the support rod. Ring type clevis hangers are not acceptable.

C. Provide Anvil Figure 45 galvanized or primed and painted channel assembly for trapeze hangers.

3.6 PIPE SUPPORTS ON ROOF

A. Support gas pipe on roof with Portable Pipe Hanger Model PP-10 with roller and fully adjustable height throughout pipe run. Base material shall be high density / high impact polypropylene with UV inhibitors and anti-oxidants. Provide with hot dip galvanized rod finish and framing. Nuts and washers shall be hot dip galvanized.

3.7 ANCHORS

A. Provide anchors as required. Use pipe anchors consisting of heavy steel collars with lugs and bolts for clamping to pipe and attaching anchor braces. Install anchor braces in the most effective manner to secure desired results. Do not install supports, anchors or similar devices where they will damage construction during installation or because of the weight or the expansion of the pipe. When possible, install sleeves in structural concrete prior to pouring of concrete.

3.8 FLOOR PENETRATIONS

A. At locations where pipe passes through floors, provide watertight concrete curb around penetration.

3.9 PIPE SLEEVES

A. Sleeves through masonry and concrete construction:
   1. Fabricate sleeves of Schedule 40 galvanized steel pipe.
   2. Size sleeve large enough to allow for movement due to expansion and to provide continuous insulation.

B. Sleeves through gypsum wall construction.
   1. Fabricate sleeves of 16 gauge galvanized sheet metal.

C. Sleeves through elevated slab construction.
   1. Fabricate sleeves of Schedule 40 galvanized steel pipe with welded center flange in floor.

D. Extend each sleeve through the floor or wall. Cut the sleeve flush with each wall surface. Sleeves through floors shall extend 2” above floor lines for waterproofing purposes. Slab on grade floors shall not be sleeved except where penetrating waterproofing membrane or insect control is required.

E. Caulk sleeves water and air tight. Seal annular space between pipes and sleeves with mastic compound to make the space water and air tight.

F. For sleeves below grades in outside walls, provide Thunderline Link-Seal or Advance Product and System Interlynx, with 316 stainless steel nuts and bolts, with cast iron pressure plate.

G. Provide chrome plated escutcheon plates on pipes passing through walls, floors or ceilings exposed to view. At exterior walls, stainless steel sheet metal is to be used.

H. For sleeves through fire and smoke rated walls, seal with a UL through-penetration firestop, rated to maintain the integrity of the time rated construction. Install in accordance with the manufacturer's installation instructions. Comply with UL and NFPA standards for the installation of firestops. Refer to Architectural drawings for all fire and smoke rated partitions, walls, floors, etc.

3.10 ISOLATION VALVES

A. Provide piping systems with line size shutoff valves located at the risers, at main branch connections to mains for equipment, to isolate central plant, and at other locations.

3.11 DRAIN VALVES

A. Install drain valves at low points of water piping systems so that these systems can be entirely drained. Install a line size drain valve for pipes smaller than 2" unless indicated otherwise. For pipes 2-1/2" and larger, provide 2" drain valves unless indicated otherwise. Drain valves shall be plugged when not in use and at completion.

3.12 CLEANING OF PIPING SYSTEMS

A. General cleaning of piping systems. Purge pipe of construction debris and contamination before placing the systems in service. Provide and install temporary connections as required to clean, purge and circulate.

B. Install temporary strainers at the inlet of pumps and other equipment as necessary where permanent strainers are not indicated. Keep strainers in service until the equipment has been tested, then remove either entire strainer or straining element only. Fit strainers with a line size blow down ball valve and pipe to nearest drain. Blow down strainers, remove and clean as frequently as necessary.

C. Phase One: Initial flushing of system. Remove loose dirt, mill scale, weld beads, rust and other deleterious substances without damage to system components. Open valves, drains, vents and strainers at all system levels during flushing procedures. Flush until “potable water clear” and particles larger than 5 microns are removed.

D. Connect dead-end supply and return headers, even if not shown on the drawings, and provide terminal drains in bottom of pipe end caps or blind flanges.

E. Dispose of water in approved manner.

F. Phase Two: Cleaning of Piping Systems. Remove, without chemical or mechanical damage to any system component, adherent dirt (organic soil), oil, grease, (hydrocarbons), soldering flux, mill varnish, piping compounds, rust (iron oxide) and other deleterious substances not removed by initial flushing. Flush system and replace with clean water.

G. Phase Three: Final flushing and rinsing: Flush and rinse until “potable water clear” and particles larger than 5 microns are removed. Operate valves to dislodge any debris in valve body. Dispose of water in approved manner.

H. Submit status reports upon completion of each phase of work on each system.

3.13 TESTING

A. Test piping after installation with water hydrostatic pressure of 1-1/2 times operating pressure (150 psig minimum) and carefully check for leaks. Repair leaks and retest system until proven watertight.

B. Do not insulate or conceal piping systems until tests are satisfactorily complete.

C. If any leaks or other defects are observed, suspend the test and correct the condition at once. Repeat testing until leaks are eliminated and the full test period is achieved.

D. The satisfactory completion of testing does not relieve the Contractor of responsibility for ultimate proper and satisfactory operation of piping systems and their accessories.

3.14 PIPE MARKERS

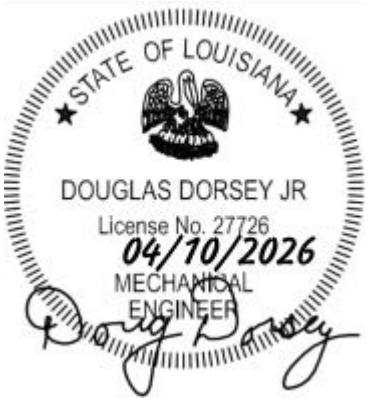
A. Identify interior exposed piping and piping in accessible chases or plenums with Opti-Code Brady Pressure Sensitive Adhesive Pipe Markers, consisting of pipe marker and direction of flow arrow tape. Clean pipe prior to installation. Background colors of markers, arrows and tape for each type of system shall be the same. Meet ANSI/OSHA standards and clearly identify each system. Provide minimum 2-1/4-inch letters through 4-inch pipe and 4-inch letters for 5-inch pipe and larger.

B. Identify exterior and mechanical room piping with Snap Around pipe markers through 4-inch pipe and Strap Around markers 5-inch pipe and larger. Pipe markers consisting of pipe marker and direction of flow arrow tape; background colors of markers, arrows and type for each type of system shall be the same. Meet ANSI / OSHA standards and clearly identify each system. Provide minimum 2-1/4-inch letters through 4-inch pipe and 4-inch letters for 5-inch pipe and larger.

C. Install identification in the following locations:
   1. Both sides of penetrations through walls, floors and ceilings.
   2. Close to valves or flanges.
   3. Intervals on straight pipe runs not to exceed 50 feet
   4. Apply marker where view is obstructed.

D. Pipe markers shall meet or exceed the specifications of the ASME A13.1 “Scheme for Identification of Piping Systems”.

END OF SECTION 22 20 00



SECTION 22 40 00

PLUMBING FIXTURES AND FIXTURE CARRIERS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish and install water closets, urinals, lavatories, electric drinking fountains, fixture carriers and plumbing appurtenances.

1.2 RELATED WORK

A. Division 22 Plumbing
   1. Drains, Hydrants and Cleanouts.
   2. Domestic Water Piping.
   3. Soil, Waste and Sanitary Drain Piping and Vent Piping.

1.3 JOB REQUIREMENTS

A. Furnish plumbing fixtures and trim as shown and specified. Provide faucets, fittings, supply stops and similar devices of a single manufacturer. Furnish faucets and supply stops with renewable seats. Porcelain to steel and enameled cast iron fixtures shall be acid resistant. Wall hung fixtures shall be installed with a fixture carrier.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Plumbing Fixtures (Vitreous China):
   1. American Standard.
   2. Kohler.
   3. Toto
   4. Zurn

B. Plumbing Faucets:
   1. American Standard.
   2. Chicago.
   3. T&S Brass.
   4. Zurn.
   5. Symmons
   6. Speakman
   7. Moen Commercial

C. Supports and Carriers:
   1. Wade
   2. Zurn
   3. J.R. Smith.
   4. Josam.
   5. Watts
   6. Mifab

D. Flush Valves:
   1. Sloan
   2. Zurn
   3. Moen Commercial

E. Supplies, Stops and Chrome Plated Tubular Brass:
   1. McGuire
   2. Kohler
   3. Chicago
   4. Zurn

F. Water Closet Seats:
   1. Beneke
   2. Church
   3. Olsonite
   4. Bemis
   5. Centoco

G. Electric Drinking Fountains:
   1. Halsey Taylor
   2. Elkay
   3. Oasis
   4. Haws

H. Floor Drains:
   1. Wade
   2. J.R. Smith
   3. Josam
   4. Zurn
   5. Watts
   6. Sioux Chief

I. Cleanouts:
   1. Wade
   2. J.R. Smith
   3. Josam
   4. Zurn
   5. Watts
   6. Mifab

J. Shower Systems:
   1. Bradley
   2. Acorn
   3. Willoughby

K. Shower Valves
   1. Chicago
   2. Acorn
   3. Symmons
   4. Bradley
   5. Moen Commercial

L. Shower Stall
   1. Aquabath
   2. Aquatic
   3. Aquarius
   4. Best Bath Systems (Access)

M. Stainless Steel Sinks:
   1. Elkay
   2. Just
   3. Griffin
   4. Moen Commercial
   5. Amtekco Industries

N. Mop Sinks:
   1. Crane Fiat
   2. Stern Williams
   3. Acorn
   4. CECO

O. Service Sinks:
   1. American Standard
   2. Kohler
   3. Eljer
   4. CECO

P. Roof Drains:
   1. Wade
   2. J.R. Smith
   3. Josam
   4. Zurn
   5. Watts
   6. Mifab

Q. Thermostatic Mixing Valves
   1. Lawler
   2. Symmons
   3. Leonard
   4. Powers
   5. Holby
   6. Bradley

R. Emergency Safety Equipment
   1. Speakman
   2. Bradley
   3. Encon
   4. Guardian
   5. Haws

S. Shock Arrestors:
   1. Precision Products
   2. Sioux Chief

T. Backflow Preventors
   1. Watts
   2. Febco
   3. Wilkins
   4. Beeco

U. Hose Bibbs
   1. Wade
   2. Chicago
   3. Josam
   4. Woodford
   5. Zurn

6. J.R. Smith

V. Wall Hydrants
1. Wade
2. Woodford
3. Zurn
4. J.R. Smith
5. Josam

W. Solids Interceptors
1. Wade
2. J.R. Smith
3. Zurn
4. Josam
5. Schier

2.2 REQUIREMENTS

A. Refer to the drawings for equipment to be supplied.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation shall be in accordance with the manufacturer's instructions.

B. Make rough-in and final connection of service to each fixture provided under this Section and other Sections or Architectural or Plumbing Drawings.

C. Provide necessary stops, valves, traps, unions, vents, cold water, hot water, sanitary, etc. for a complete installation.

D. Provide isolation valves in domestic water lines to isolate all equipment, restrooms, hose bibbs, and where shown on drawings.

E. Remove piping and services roughed-in incorrectly and install correctly, without cost.

F. Exposed piping, fittings and appurtenances shall be chrome-plated brass.

G. Coordinate with the Contractor for locations and service required for each plumbing fixture.

H. All floor drains and floor sinks shall have trap primer connections. Provide trap primer valves and 1/2-inch water line to each floor drain connection. Trap primer supply line shall have ball valve and Y strainer on inlet side of trap primer valve to facilitate cleaning.

I. All floor drains and floor sinks shall have Pro-Set “Trap Guard” for trap seal protection.

J. All floor drains and floor sink locations are to be coordinated with all equipment. Locate drains in mechanical equipment spaces to conform to drain locations of equipment furnished. Coordinate drain location with food service equipment and Architectural Drawings.

K. All floor drains, floor sinks and cleanout covers are to be provided with stainless steel vandal resistant screws.

L. Trap primer valves installed in concealed spaces shall have approved access doors for accessibility.

END OF SECTION 22 40 00

SECTION 22 63 11

GAS PIPING AND APPURTENANCES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish and install steel gas pipe inside buildings, including the supply line from the meter, service lines to gas equipment and appliances, termination of the service line with a plug valve, drip leg, and final connection to equipment and appliances with unions.

B. Coordinate service line from utility main and extend to meter. Coordinate installation of the service line and meter with Gas Company.

C. Extend steel gas piping from meter to inside the building to all fixtures, appliances and equipment requiring gas.

1.2 RELATED WORK

A. Division 22 Plumbing
   1. Plumbing Pipe and Fittings
   2. Valves and Vents

1.3 UTILITY CONNECTIONS

A. Make arrangements for and pay all fees and connection charges for obtaining service to the building.

PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS - ABOVE GRADE

A. Pipe 2 inch and Smaller:
   1. Schedule 40 ASTM A 53 black steel pipe
   2. Factory fabricated socket weld fittings.

B. Pipe Larger than 2 inch:
   1. Schedule 40 ASTM A 53 black steel pipe.
   2. Factory fabricated butt weld fittings for welded steel pipes shall conform to ASTM A-234 WPB (seamless weld fittings).

C. Unions:
   1. Standard 150 lb. (300 lb. water, oil or gas) malleable iron.
   2. Ground joint unions, with bronze seat.
   3. Flange joints for pipe larger than 2 inch in diameter.

D. Flanges:
   1. Steel flanges. ANSI B16.5 and ASTM A-105.

2.2 PIPE AND FITTINGS - BELOW GRADE OUTSIDE BUILDING

A. Polyethylene pipe shall be ASTM D3350 Grade PE24 cell classification and ASTM D1248 Class B material classification.

B. Pipe shall be medium density polyethylene PE 2406 and PE 2708 manufactured by Poly Pipe Industries, Inc. or Performance Pipe.

C. Polyethylene yellow molded butt fittings for use with medium density polyethylene pipe shall meet

testing requirements of ASTM D2513 and resin material listing of ASTM D3350 with PPI designation of PE 2406 as manufactured by Central Plastics Co.

2.3 PIPE AND FITTINGS - IN SLEEVE TO ISLAND LAB TABLES (use only where allowed or required by City)

A. Corrugated stainless steel tubing meeting ASTM A240, type 304, with polyethylene jacketing, flame retardant ASTM E84 index flame 25, smoke 20, with cast bronze fittings. Gastite or approved equivalent.

2.4 PIPE AND FITTINGS - IN UTILITY TRENCH TO ISLAND LAB TABLES

A. Pipe as specified in paragraph 2.1 above, run in utility trench similar to ABT, Inc., Polyduct Utility Trench, 39.2 inch long sections x 12 inches wide x 7 inches deep rectangular polymer concrete, non-sloping, flat bottom, solid cover steel floor plate bolted to unitized frame.

2.5 VALVES

A. See specific Section related to valves.

2.6 GAS PRESSURE REGULATOR

A. Size the gas pressure regulator in accordance with the manufacturer's recommendations for flow quantities and reduced pressure as required for all equipment. Coordinate final equipment gas pressure requirements prior to ordering regulators. Provide American Meter Company regulators or approved equal, suitable for outdoor installation. Regulators outside exposed to weather shall be installed with vent in vertical down position.

B. All line pressure regulators shall be listed ANSI (American National Standard) E2.180A-2000 and CSA (Canadian Standards Association Standard) CGA6.22A-M00.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation Standards: Install gas piping in accordance with recommendations of the National Fire Protection Association.

B. Drip Legs: Install a capped drip leg 6 inches long at the base of each vertical rise.

C. Coating and Wrapping. Coat and wrap underground piping in accordance with the service utility company standards.

D. Sleeves.
1. Encase gas piping running in or through solid partitions with thin wall metal conduit. Sleeve piping and fittings shall be two pipe sizes, but not less than 1 inch larger than encased gas piping.
2. Encase gas piping running below slab in Schedule 40 PVC, minimum size two pipe sizes larger than gas pipe. Vent PVC sleeve to atmosphere with a 1-1/2 inch vent with 1-1/2 inch return bend above building roof. Seal ends of sleeve with UL fire rated caulk.

E. Do not install gas piping exposed to view inside public area, or occupied spaces, without prior written approval.

F. Weld all gas piping above grade.

G. Provide test ports and isolation valves to enable proper testing of system in the future.

H. Provide isolation valve and unions across regulators for proper removal.

I. Provide transition risers where below grade polyethylene pipe changes to steel pipe above grade.

J. Gas Pressure Regulators / Vents:
   1. Piping shall be sized in accordance with the regulator manufacturer's instructions. Where there is more than one regulator at a location, each regulator shall have a separate vent to the roof / outdoors.
   2. Install vent piping from regulators to location to prevent gas smells from entering building.
   3. Install double elbows and insect screen at end of piping to prevent moisture and insects from entering.
   4. When installed inside building route vents horizontally and terminate through building sidewall. Vents terminating through roof must have prior approval from Architect before installation. Through roof penetrations shall be minimized.
   5. Regulators installed outside or on roof top: Install regulator vent turned downward with insect screen over vent opening. The vent shall be designed to prevent the entry of water, insects, or other foreign materials that could cause blockage.

3.2 TESTING GAS PIPING

A. Preliminary gas test as required by Code, but minimum test pressure of 50 PSI held for not less than eight hours without noticeable drop.

B. Test joints with a soap solution while lines are under pressure.

C. Repair leaks.

D. Final gas test shall be with a 24 inch column of mercury or a diaphragm gauge with a minimum dial size of 3-1/2 inches with a set hand and a pressure range not to exceed twenty (20) psig with 2/10-pound increments. The minimum test pressure shall not be less than ten (10) psi and the maximum test pressure shall not exceed twelve (12) psig. This test will be observed for no less than (30) thirty minutes with no drop in pressure.

E. Provide copy of gas pressure test reports in Operations & Maintenance Manual.

3.3 IDENTIFICATION CONDUCTOR

A. Spiral A #12 AWG insulated copper conductor the full length of the thermoplastic piping system. Fasten to the pipe at 3 foot intervals with plastic tie wraps.

B. Terminate at each end in a 12 inch x 12 inch x 4 inch FRP junction box.
   1. Bolted gasketed cover with stainless steel screws.
   2. Screw type terminal strip.
   3. Legend on cover "gas pipe identification conductor."

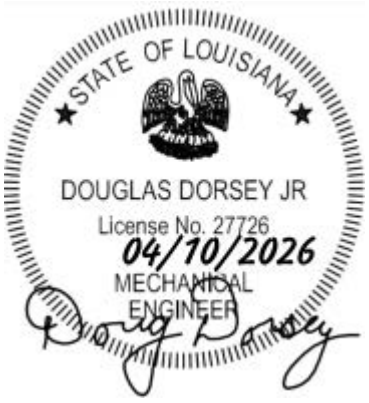
C. Set in concrete pad.

3.4 PAINT EXPOSED OUTSIDE GAS PIPE

A. Interior and Exterior Gas piping shall be protected from rust.

B. Paint pipe with a flat alkyd coating, clean pipe prior to painting by preparing surface by hand tool cleaning per SSPC-SP2-82, applying one coat of Glidden Y-590 Rustmaster Metal Primer White and top coat of Yellow Alkyd Flat Enamel.

END OF SECTION 22 63 11



SECTION 22 63 13

MEDICAL GAS PIPING SYSTEMS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish, install, and test complete piping system for vacuum (V) and medical/clinical compressed air (A) systems as detailed on the drawings.

B. Provide outlets, valve boxes, valves, alarm systems, pressure and vacuum switches, air compressor, vacuum pump and miscellaneous accessories for complete systems.

C. Pressure testing, cross connection testing and final testing, including purging and analyzing.

D. Certification Procedure-**THE SYSTEM WILL BE FOR TEACHING PURPOSES AND CERTIFICATION WILL NOT BE REQUIRED**.

1.2 RELATED WORK

A. Testing Mechanical Systems.

B. Piping and Fittings.

C. Division 26 Electrical. Wiring for ceiling columns/hose drops, alarms, and electrical accessories associated with the system.

1.3 CODE COMPLIANCE/QUALITY ASSURANCE

A. Installation shall comply with the National Fire Protection Association (NFPA) as set forth in NFPA 99, Chapter 3, NFPA 56F, and NFPA 50, and Standard for Medical Surgical-Vacuum Systems, NFPA 99, Chapter 6.

B. Comply with local, state or federal codes.

C. Employ manufacturer-trained installers.

1.4 COORDINATION

A. Coordinate with others to ensure timely installations and to avoid conflicts and interference.

B. Work with metal stud partition installer and/or mason to ensure anchors, sleeves and similar items are provided in sufficient time to avoid delays; chases and openings are properly sized and prepared.

C. Coordinate layout of medical gas systems in spaces and identify piping and in accordance with coded paint color required.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS; SYSTEMS

A. Pipe shall be seamless Type K or L, (ASTM B819) copper tubing or standard weight Schedule 40 brass pipe; NFPA 56F. Piping for vacuum systems may be Type K or L, (ASTM B819) copper tubing; comply with NFPA 99, Chapter 6. Piping shall be precleaned and plugged by supplier before shipment to job site.

B. Pipe shall be seamless copper tubing, hard temper, with brazed joint fittings.

C. Fittings shall be wrought copper, brass or bronze designed expressly for brazed connection.

D. Brazing alloy shall have a melting point of minimum 1000 degrees F.

E. Flux shall not be used for copper-to-copper joints; use for jointing copper to brass or bronze.

F. Isolation of copper tubing from dissimilar metal shall be accomplished either through use of copper teardrop hangers or plastic isolators.

2.2 MEDICAL GAS OUTLET STATIONS

A. Quick-connect Recessed Wall Outlets:
   1. Medical gas outlet stations shall be modular, quick-disconnect recessed type, equal to Ohmeda. Modular outlet stations shall be field-assembled with sequences and services indicated. Centerline spacing of multiple outlets shall be 5 inch minimum.
   2. Outlet stations for medical gases shall have a stainless steel face plate mounted on a chrome-plated, zinc die-cast cover plate. The cover plate assembly shall contain quick connect latch release mechanism.
      a. Furnish indexing pins for safety keying and gas-specific cover plate to the appropriate rough-in box, with color-coded gas service identification. The safety-keying index pins shall be permanently captured between the cover plate and latch assembly. Designs with index pins molded in plastic are not acceptable.
   3. The latch mechanisms shall be designed for one-handed, single thrust mounting and one-handed finger tip release of secondary equipment.
      a. The outlet stations shall be capable of supporting common secondary equipment, including suction regulator and half-gallon collection bottle, without the use of slide brackets.
   4. The cover plate shall attach to the primary valve assembly. The primary valve body shall be threaded into the rough-in box separately from the cover plate to facilitate leak-testing around the valve.
      a. Designs which prevent this test will not be acceptable.
      b. The primary valve body shall be made of brass and shall be adjustable to compensate for variation in plaster thickness.
      c. Provide an O-ring within the valve to seal mating adapter plugs. Future replacement of the O-ring shall not require disassembly of the cover plate.
      d. The primary valve poppet shall be self-sealing in service, requiring no dust cap or cover.
   5. Each rough-in box shall contain a base and tube assembly consisting of a Type K copper pigtail, flared to accept 1/4 inch ID, 3/8 inch OD supply line, brass block and base housing a secondary check valve in accordance with NFPA 45F (not required in vacuum), primary valve O-ring seal, check valve deflator spring (except vacuum), pressure testing cap plug, and plaster shield. The copper inlet tube shall be capable of rotating 360 degrees to adjust for field piping conditions.
   6. Medical gas outlets shall be cleaned for oxygen service in accordance with CGA Pamphlet G-4.1.
      a. The assembly shall be capped and internal parts poly-bagged for shipment. The outlet assembly shall bear the label of listing under Re-examination Service of Underwriters Laboratory.
   7. Quantity and gas type shall be provided as indicated.

2.3 MEDICAL GAS CEILING OUTLET STATIONS

A. D.I.S.S. RECESSED CEILING OUTLETS:
   1. Medical gas outlet stations shall be Ohmeda Series, Modular DISS type. Modular outlet stations shall be field-assembled with sequences and services indicated on the plans.
      a. Centerline spacing of multiple outlets shall be 5 inch minimum.

   2. Outlet stations for medical gases shall have a stainless steel face plate mounted on a chrome-plated, zinc die-cast cover plate. The cover plate assembly shall contain indexing pins for safety keying the gas-specific cover plate to the appropriate rough-in box. The safety keying index pins shall be permanently captured between the cover plate and index pin retainer.
      a. Designs with index pins molded in plastic are not acceptable.
      b. Provide a color-coded, molded plastic gas service identification label on each cover plate.

3. The outlet stations shall be capable of supporting common secondary equipment, including suction regulator and half-gallon collection bottle, without the use of slide brackets.
4. The cover plate shall attach to the primary valve assembly and rough-in box. The primary DISS valve shall be independently safety-keyed to prevent cross-connection.
    a. In addition, the DISS valve shall thread into the rough-in box separately from the cover plate to facilitate leak-testing around the valve. Designs which prevent this test will not be acceptable. The primary valve shall be made of brass, chrome plated and shall contain a poppet that is self-sealing in service, requiring no dust cap or cover.
    b. The primary valve shall be adjustable to compensate for variations in plaster thickness.
5. Quantity and gas type shall be provided as indicated on plans.
6. Each rough-in box shall contain a base and tube assembly consisting of a Type K copper pigtail, flared to accept a 1/4 inch ID, 3/8 inch OD supply line, brass block and base housing a secondary check valve in accordance with NFPA 56F (not required in vacuum), primary valve O-ring seal, check valve deflator spring, (except vacuum), pressure testing cap plug, and plaster shield. The copper inlet tube shall be capable of rotating 360 degrees to adjust for field piping conditions.
7. Medical gas outlets shall be cleaned for oxygen service in accordance with CGA Pamphlet G-4.1. The assembly shall be capped and internal parts poly-bagged for shipment. The outlet assembly shall bear the label of listing under Re-examination Service of Underwriters Laboratory.

B. Hose Drop Assemblies:
1. Hose assemblies shall use gas specific color coded hose that meets or exceeds conductivity requirements specified in NFPA 56A, (NFPA 99, Chapter 3).
    a. Hose assembly shall consist of a DISS female fitting for attaching to the ceiling outlet, a hose retractor and Chemetron quick-connect coupler (Dyna-con for N_2) with inherent primary and secondary check valves, for attaching to hoses connected to patient care equipment.
2. Hose assemblies are to be supplied for a finished ceiling height as indicated on drawings.
    a. Quantities and gas services as indicated.

2.4 MEDICAL GAS VALVES

A. Main and Base of Riser Valves (Valves Not in Boxes):
1. Valves and tubes shall be specially prepared for oxygen service and shall conform to NFPA 56F. Valves shall be ball-type, with Teflon seats and adjusting stem packing gland with Teflon stem seal, through 2 inch sizes. 2-1/2 inch to 3-inch valves shall have Teflon seats and double Teflon stem seal. 4-inch valves shall have Buna-N ball seats.
2. Ball valves rated at 400 psig, actuate from full "ON" to full "OFF" by 90 degree turn of vinyl gripped valve handle. Factory installed copper tubing shall be extended sufficiently to help prevent valve seat damage during soldering.
3. Unless noted or required, main and riser valves located in other than public areas are not required to be installed in boxes.
4. Valves shall be equal to Ohmeda 207-6000 series. Quantities and sizes as indicated on plans.

B. Area/Zone Valves (Valves in Boxes):
1. Zone valve boxes shall be constructed of extruded aluminum or 18 gauge sheet steel with air dried lacquer finish. The cover frame shall be made of anodized aluminum and attached to the box by concealed screws. The finished assembly shall be dust-tight.
    a. The frame assembly shall be capable of adjusting for variances in wall thickness up to 1-inch and contain an easily removable cover window with pull ring. The window shall conceal exposed piping and valves in the box and be labeled "Caution - Medical Gas Shut-Off Valves - Close Only in Emergency." Clear viewing space shall be provided in the window to display the gas service, the area controlled by the valve, and pressure gauges.
2. Frames for valve boxes shall have uniform width for balanced appearance. Provide color-coded self-adhesive gas service labels for compliance with NFPA 56F labeling requirements. Apply labels to each valve in the assembly for gas service identification according to the manufacturer's instructions.
3. Place the valve in the zone valve box so that the removable window cannot be replaced when any valve is closed. Factory installed type K copper pipe extensions shall extend 3-inches outside the

valve box. Design the valve box so that valves may be removed before brazing, without disassembly of the box, to permit field rearrangement of valves.

a. Valves shall be ball type, cleaned for oxygen service, supplied with capped ends, and operate full open to closed position with 90 degree handle rotation.

4. Gauge model zone valve assemblies shall include 1-1/2 inch pressure gauges reading 0 to 100 psig for oxygen, nitrous oxide, and air: 0 to 300 psig for nitrogen, and 0 to 30 inch hg for vacuum or evacuation vacuum. The gauge port shall be equipped with removable plug for pressure testing before final assembly of gauge.
5. All gauge model zone valve box assemblies shall read pressure downstream and vacuum upstream of the valve per NFPA 56F. Valves shall be piped left to right.
6. Valve boxes shall be equal to Ohmeda 321-4000 series. Sizes and quantities required as shown.

PART 3 - EXECUTION

3.1 IDENTIFICATION

A. Copper pipe, tubing, valves, and fittings shall be precleaned and prepared for oxygen service in accordance with Chapter 5 of NFPA 56F and Chapter 6 of NFPA 99 for vacuum piping, except those supplied especially prepared for oxygen service by the manufacturer and received sealed on the job.

B. Joints in the piping, except those at equipment requiring screwed connections, shall be made with silver brazing alloy or similar high melting point at least 1000°F brazing metal.

1. Silver brazing material for pipes and fittings in the medical gas system shall be Stay-Silv-15 or equal to the following: Silvaloy-15, Aircosil #15, or Phos-Silver-15. The silver brazing alloy shall have a minimum of 1000 degree F liquidux melting point and shall have an ASTM rating of "BCuP5". The use of flux is prohibited when making of joints between copper to copper pipes and fittings. Appropriate flux similar to "Stay-Silv-Black Flux" or "Stay-Silv-White Flux" is required between dissimilar metals such as copper to brass or bronze material, when parts are heated over a prolonged period.
2. During brazing of pipe connections, the interior of the pipe shall be purged continuously with nitrogen. The outside of the tube and fittings shall be cleaned by washing with hot water after assembly.

C. Threaded joints in piping systems shall be tinned or made up with polytetrafluorethylene (such as Teflon) tape or other thread sealants suitable for oxygen service. Sealants shall be applied to the male threads only.

D. Piping shall be supported with pipe stays or hangers at appropriate intervals and not supported by other piping. Isolation of copper piping from dissimilar metals shall be of a firm, positive nature. Duct tape is not acceptable as isolation material.

E. Install screw joints used in shutoff valves, including station outlet valves, by tinning the male thread with soft solder. Litharge and glycerine or an approved oxygen luting or sealing compound is acceptable.

F. Use prepared flux manufactured by Handy and Harman which consists of dry boric and water boric for hard solder joints. Alcohol mixture is prohibited. Resin or petroleum base of similar paste flux may contain compounds objectionable for oxygen service and shall not be employed.

G. Pipe, pipe fittings, and valves not furnished prewashed and degreased shall be cleaned and degreased by washing in a hot solution of sodium carbonate or tri-sodium phosphate (Dakite #24) and then thoroughly rinsed with water. Dakite #24 solution of six to eight ounces of Dakite per gallon of water is prepared by mixing one-third the total quantity of water with the total amount of Dakite #24 required. When this has been dissolved, the remaining water shall be added. The pipe and fittings shall be immersed for five to fifteen minutes or until all deposits are removed. Scrubbing shall be employed where necessary to insure complete cleaning. After washing, the material shall be rinsed thoroughly in clean, hot water. After cleaning, exercise care in storage and handling of pipe fittings. Pipe and fittings shall be temporarily capped or plugged to prevent recontamination before final assembly. Tools used for cutting or reaming shall be kept free from oil or grease. Where contamination has occurred, the items affected shall be rewashed and rinsed.

H. After installation of the piping, but before installation of the outlet valves, blow lines clear using oil-free dry air or nitrogen.

I. Buried piping shall be protected against frost, corrosion and physical damage. Ducts or casings shall be used wherever buried piping traverses a roadway, driveway, parking lot or other area subject to surface loads.

J. Piping exposed to physical damage shall be protected.

3.2 PRESSURE TESTING

A. After installation of the piping and valves, but before installation of the service outlets, alarm actuating switches and gauges, the line shall be blown clear using oil-free dry air or nitrogen.

B. Next, each section of the piping system shall be subjected to a test pressure of 1-1/2 times the maximum working pressure, but not less than 150 psig, with oil-free dry air or nitrogen. Then each joint shall be examined for leaks by means of soapy water or other means of leak detection safe for use with oxygen.

C. All leaks shall be repaired and the section retested.

D. After completing testing of each individual piping system, the medical gas systems shall be subjected to a pressure test at 1-1/2 times the maximum working pressure, but not less than 150 psig. The main line shut-off valve shall be closed during the test.

E. After completion of the above test procedure, the finishing assemblies of station outlets, alarms, and components (that is, pressure switches, gauges, relief valves, etc.) shall be installed and all medical gas piping systems shall be subjected to a 24 hr. standing pressure test at 20% above the normal operating line pressure. The main line shut-off valve shall be closed during this test.

F. Leaks shall be located, repaired, and the system retested.

G. To determine that no cross connection to other pipeline systems exists, reduce all systems to atmospheric pressure. Disconnect sources to test gas from the systems with the exception of the one system to be checked. Pressure this system with oil-free, dry air or nitrogen to a pressure of 50 psig. With appropriate adapters matching outlet labels, check each individual station outlet on systems installed to determine that test gas is being dispensed from only the outlets of this system.

H. When medical gas piping systems have been tested, the source of test gas shall be disconnected and the proper gas source of supply connected to each system. Following connection and pressurization, outlets shall be opened in progressive order, starting nearest the source and completing the purge flushing at the outlet farthest from the source. Gas shall be permitted to flow from each outlet until each system is purged of test gas used during tests. After completion of purge flushing of the pipeline system, the outflow from each designated and labeled oxygen outlet station, anesthesia machine, and other oxygen dispensing equipment shall be tested (using an oxygen analyzer) to confirm the presence of the desired purity of oxygen.

3.3 CROSS CONNECTION TESTING AND CERTIFICATION

A. Cross connection testing of the medical gas system shall be performed by factory trained technicians from the medical gas pipeline equipment supplier.

B. Medical gas system shall be tested in accordance with NFPA 56F, latest edition, Section 5.

C. In addition to cross connection testing, the equipment manufacturer shall test each individual pipeline system components for performance to design specifications. Make necessary adjustments to ensure a complete and working system.

D. Obtain and present to the Owner a complete bond report of pipeline certification from the equipment manufacturer. The letter of certification shall indicate:

1. The system is free of crossed connections.
2. System components perform to the manufacturer's design specifications.
3. System components, particularly the medical air compressor and vacuum pump controls and the alarm system, have been adjusted in accordance with the manufacturer's recommendations.

END OF SECTION 22 63 13

DIVISION 23
HEATING, VENTILATING, AND AIR CONDITIONING

23 01 00	HVAC OPERATING AND MAINTENANCE MAUALS
23 05 00	MECHANICAL GENERAL PROVISIONS
23 05 10	HVAC CONTRACT QUALITY CONTROL
23 05 11	MECHANICAL ALTERNATIVES PROJECT PROCEDURES
23 05 12	SHOP DRAWINGS, COORDINATION DRAWINGS & PRODUT DATA
23 05 13	ELECTRICAL PROVISIONS OF HVAC WORK
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23 05 93	TESTING, BALANCING AND ADJUSTING OF ENVIRONMENTAL SYSTEMS
23 07 13	EXTERNAL DUCT INSULATION
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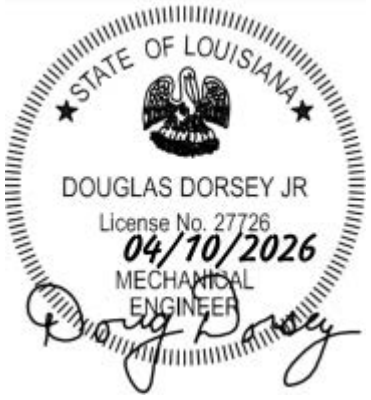


SECTION 23 01 00

HVAC OPERATING AND MAINTENANCE MANUALS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Compilation product data and related information appropriate for Owner's operation and maintenance of products furnished under Contract. Prepare operating and maintenance data as specified.

B. Instruct Owner's personnel in operation and maintenance of equipment and systems.

C. Submit three copies of complete manual in final form.

1.2 SUBMITTALS

A. Thirty (30) days after the Contractor has received the final scheduled identified submittals bearing the Architect/Engineer's stamp of acceptance (including resubmittals), submit for review one copy of the first draft of the Operating and Maintenance Manual. This copy shall contain as a minimum:
   1. Table of Contents for each element.
   2. Contractor information.
   3. All submittals, coordination drawings and product data, reviewed by the Architect/Engineer; bearing the Architect/Engineer's stamp of acceptance. (When submittals are returned from Engineer "Correct as Noted", corrected inserts shall be included.)
   4. All parts and maintenance manuals for items of equipment.
   5. Warranties (without starting dates)
   6. Certifications that have been completed. Submit forms and outlines of certifications that have not been completed.
   7. Operating and maintenance procedures.
   8. Form of Owner's Training Program Syllabus (including times and dates).
   9. Control operations/equipment wiring diagrams.
   10. Schedule of filters for each item of equipment.
   11. Schedule of belts for each item of equipment.
   12. Other required operating and maintenance information that are complete.

B. Copy will be returned to the Contractor with comments for corrections.

C. Submit three (3) completed manuals in final form to the Architect/Engineer one day after substantial completion, and prior to Owner's instructions. Include all specified data, test and balance reports, drawings, dated warranties, certificates, reports, along with other materials and information.

D. The Architect/Engineer will review the manuals for completeness.

E. The Contractor shall be notified of any missing or omitted materials. The Manuals shall be reworked by the Contractor, as required, in the office of the Architect / Engineer. The manuals will not be retransmitted.

F. Two (2) complete Manuals will be delivered to the Owner.

PART 2 - PRODUCTS

2.1 BINDERS

A. Commercial quality black three-ring binders with clear overlay plastic covers.

B. Minimum ring size: 1".
Maximum ring size: 3".

C. When multiple binders are used, correlate the data into related groupings.

D. Label contents on spine and face of binder with full size insert. Label under plastic cover.

PART 3 - EXECUTION

3.1 OPERATION AND MAINTENANCE MANUAL

A. Form for Manuals:
1. Prepare data in form of an instructional manual for use by Owner's personnel.
2. Format:
a. Size: 8-1/2" x 11".
b. Text: Manufacturer's printed data or neatly typewritten.
3. Drawings:
a. Provide reinforced punched binder tab and bind in text.
b. Fold larger drawings to size of text pages.
4. Provide flyleaf indexed tabs for each separate product or each piece of operating equipment.
5. Cover: Identify each volume with typed or printed title "Operating and Maintenance Instructions". List:
a. Title of Project
b. Identity of separate structures as applicable.
c. Identity of general subject matter covered in the manual.
6. Binder as specified.

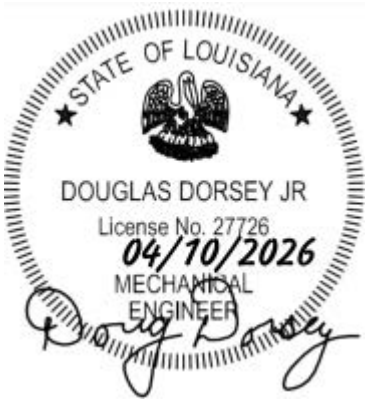
B. Content of Manual:
1. Neatly typewritten Table of Contents for each volume arranged in systematic order as outlined in the specifications.
a. Contractor, name of responsible principal, address and telephone number.
b. A list of each product required to be included, indexed to content of the volume.
c. List with each product, name, address and telephone number of:
1) Subcontractor or installer.
2) Maintenance contractor as appropriate.
3) Identify area of responsibility of each.
4) Local source of supply for parts and replacement.
d. Identify each product by product name and other identifying symbols as set forth in Contract Documents.
2. Product Data:
a. Include those sheets pertinent to the specific product.
b. Annotate each sheet to:
1) Identify specific product or part installed.
2) Identify data applicable to installation.
3) Delete references to inapplicable information. (All options not supplied with equipment shall be marked out indicated in some manner.
3. Drawings:
a. Supplement product data with drawings as necessary to illustrate:
1) Relations of component parts of equipment and systems.
2) Control and flow diagrams.
b. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.
c. Do not use Project Record Documents as maintenance drawings.
4. Written text, as required to supplement product data for the particular installation:
a. Organize in consistent format under separate headings for different procedures.

b. Provide logical sequence of instructions for each procedure.

5. Copy of each warranty, bond and service contract issued.
   a. Provide information sheet for Owner's personnel, giving:
      1) Proper procedures in event of failure.
      2) Instances that might affect validity of warranties or bonds.
6. Shop drawings, coordination drawings and product data as specified.

C. Sections for Equipment and Systems.
1. Content for each unit of equipment and system as appropriate:
   a. Description of unit and component parts.
      1) Function, normal operating characteristics, and limiting conditions.
      2) Performance curves, engineering data and tests.
      3) Complete nomenclature and commercial number of replaceable parts.
   b. Operating procedures:
      1) Start up, break-in, routine and normal operating instructions.
      2) Regulation, control, stopping, shut down and emergency instructions.
      3) Summer and winter operating instructions.
      4) Special operating instructions.
   c. Maintenance procedures:
      1) Routine operations
      2) Guide to trouble-shooting.
      3) Disassembly, repair and reassembly.
      4) Alignment, adjusting and checking.
      5) Routine service based on operating hours.
   d. Servicing and lubrication schedule. List of lubricants required.
   e. Manufacturer's printed operating and maintenance instructions.
   f. Description of sequence of operation by control manufacturer.
   g. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.
      1) Predicted life of part subject to wear.
      2) Items recommended to be stocked as spare parts.
   h. As installed control diagrams by controls manufacturer.
   i. Complete equipment internal wiring diagrams.
   j. Schedule of filters for each air handling system.
   k. Schedule of belts for each item of equipment.
   l. Each Contractor's coordination drawings.
   m. As installed color coded piping diagrams.
   n. Charts of valve tag number, with location and function of each valve.
   o. List of original manufacturer's spare parts and recommended quantities to be maintained in storage.
   p. Other data as required under pertinent sections of the specifications.
2. Prepare and include additional data when the need for such data becomes apparent during instruction of Owner's personnel.
3. Additional requirements for operating and maintenance data as outlined in respective sections of specifications.
4. Provide complete information for products specified in Division 23.
5. Provide certificates of compliance as specified in each related section.
6. Provide start up reports as specified in each related section.
7. Provide signed receipts for spare parts and material.
8. Provide training report and certificates.
9. Provide extended compressor warranty certificates.

END OF SECTION 23 01 00



SECTION 23 05 00

MECHANICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Except as modified in this Section, General Conditions, Supplementary Conditions, applicable provisions of the General Requirements, and other provisions and requirements of the contract documents apply to work of Division 23 Mechanical.

B. Applicable provisions of this section apply to all sections of Division 23, Mechanical.

1.2 CODE REQUIREMENTS AND FEES

A. Perform work in accordance with applicable statutes, ordinances, codes and regulations of governmental authorities having jurisdiction.

B. Mechanical work shall comply with applicable inspection services:
   1. Underwriters Laboratories
   2. National Fire Protection Association
   3. State Health Department
   4. Local Municipal Building Inspection Department
   5. Americans with Disabilities Act Standards

C. Resolve any code violations discovered in contract documents with the Engineer prior to award of the contract. After Contract award, any correction or additions necessary for compliance with applicable codes shall be made at no additional cost to the Owner.

D. This Contractor shall be responsible for being aware of and complying with asbestos NESHAP regulations, as well as all other applicable codes, laws and regulations.

E. Obtain all permits required.

1.3 CONTRACTOR'S QUALIFICATIONS

A. An approved contractor for the work under this division shall be:
   1. A specialist in this field and have the personnel, experience, training, skill, and organization to provide a practical working system
   2. Able to furnish evidence of having contracted for and installed not less than 3 systems of comparable size and type that has served their Owners satisfactorily for not less than 3 years

1.4 REFERENCE SPECIFICATIONS AND STANDARDS

A. Materials which are specified by reference to Federal Specifications; ASTM, ASME, ANSI, or AWWA Specifications; Federal Standards; or other standard specifications must comply with latest editions, revisions, amendments or supplements in effect on date bids are received. Requirements in reference specifications and standards are minimum for all equipment, material, and work. In instances where specified capacities, size, or other features of equipment, devices, or materials exceed these minimums, meet specified capacities.

1.5 CONTRACT DRAWINGS

A. Contract drawings are diagrammatic only and do not give fully dimensioned locations of various elements of work. Determine exact locations from field measurements.

1.6 PROJECT RECORD DOCUMENTS

A. Maintain at the job site a separate set of white prints (black line) of the contract drawings for the sole purpose of recording the "as-built" changes and diagrams of those portions of work in which actual construction is at variance with the contract drawings. Mark the drawings with a colored pencil. Prepare, as the work progresses and upon completion of work, reproducible drawings clearly indicating locations and sizes of various lines, valves, ductwork, traps, equipment, and other pertinent items, as installed. Record existing and new underground and under slab piping with dimensioned locations and elevations of such piping.

B. At the conclusion of the project, obtain without cost to the Owner, copies of the original drawings and transfer as-built changes to these. Provide a hard copy of this As-Built Set for the owner's records. The As-Built Set must include all drawings, regardless of whether corrections were necessary. Digital copies of the As-Built Set shall be provided to the architect and engineer. Digital drawings shall be in PDF format. The delivery of the As-Built Set is a condition of final acceptance.

C. Drawings in the As-Built Set should indicate the following information as a minimum:
1. Indicate all addendum changes to documents.
2. Remove Engineer's seal, name, address and logo from drawings.
3. Mark documents RECORD DRAWINGS.
4. Clearly indicate: DOCUMENT PRODUCED BY
5. Indicate all changes to construction during construction. Indicate actual routing of all piping, ductwork, etc. that were deviated from construction drawings.
6. Indicate exact location of all underground mechanical piping and elevation.
7. Indicate exact location of all underground electrical raceways and elevations.
8. Correct schedules to reflect (actual) equipment furnished and manufacturer.
9. Location and size of all ductwork and mechanical piping above ceiling including exact location of isolation of domestic and mechanical valves.
10. Exact location of all electrical equipment in and outside of the building.
11. Exact location of all roof mounted equipment, wall, roof and floor penetrations.
12. Cloud all changes.

1.7 SPACE REQUIREMENTS

A. Consider space limitations imposed by contiguous work in selection and location of equipment and material. Do not provide equipment or material that is not suitable in this respect.

1.8 RELATION WITH OTHER TRADES

A. Carefully study all matters and conditions concerning the project. Submit notification of conflict in ample time to prevent unwarranted changes in any work. Review other Divisions of these specifications to determine their requirements.

B. Because of the complicated relationship of this work to the total project, conscientiously study the relation and cooperate as necessary to accomplish the full intent of the documents.

C. Provide sleeves and inserts in forms as required for the work. Stub up and protect open ends of pipe before any concrete is placed. Furnish sizes of required equipment pads. Furnish and locate bolts and fittings required to be cast in them.

D. Locate and size openings required for installation of work specified in this Division in sufficient time to prevent delay in the work.

E. Refer to other Divisions of the specifications for the scope of required connections to equipment furnished under that Division. Determine from the Contractor for the various trades, the Owner, and by direction from the Architect/Engineer, the exact location of all items.

1.9 CONCEALED AND EXPOSED WORK

A. When the word "concealed" is used in connection with insulating, painting, piping, ducts and the like, the work is understood to mean hidden from sight as in chases, furred spaces or above ceilings. "Exposed" is understood to mean open to view.

1.10 GUARANTEE

A. Guarantee work for 1 year from the date of substantial completion of the project. During that period make good any faults or imperfections that may arise due to defects or omissions in material, equipment or workmanship. At the Owner's option, replacement of failed parts or equipment shall be provided.

1.11 MATERIAL AND EQUIPMENT

A. Furnish new and unused materials and equipment meeting the requirements of the paragraph specifying acceptable manufacturers. Where two or more units of the same type or class of equipment are required, provide units of a single manufacturer.

1.12 NOISE AND VIBRATION

A. Select equipment to operate with minimum noise and vibration. If objectionable noise or vibration is produced or transmitted to or through the building structure by equipment, piping, ducts or other parts of work, rectify such conditions at no additional cost. If the item of equipment is judged to produce objectionable noise or vibration, demonstrate at no additional cost that equipment performs within designated limits on a vibration chart.

1.13 ACCEPTABLE MANUFACTURERS

A. Manufacturers names and catalog number specified under sections of Division 23 are used to establish standards of design, performance, quality and serviceability and not to limit competition. Equipment of similar design, equal to that specified, manufactured by a named manufacturer will be acceptable on approval. A request for prior approval of equipment not listed must be submitted ten (10) days before bid due date. Submit complete design and performance data to the Engineer.

1.14 OPERATING TESTS

A. After all mechanical systems have been completed and put into operation, subject each system to an operating test under design conditions to ensure proper sequencing and operation throughout the range of operation. Tests shall be made in the presence of the Architect/Engineer. Make adjustments as required to ensure proper functioning of all systems. Special tests on individual systems are specified under individual sections. Submit 3 copies of all certifications and test reports adequately in advance of completion of the work to allow for remedial action as required to correct deficiencies discovered in equipment and systems.

1.15 WARRANTIES

A. Submit 3 copies of all warranties and guarantees for systems, equipment, devices and materials. These shall be included in the Operating and Maintenance Manuals.

1.16 BUILDING CONSTRUCTION

A. It shall be the responsibility of each sub-contractor to consult the Architectural and Engineering drawings, details, and specifications and thoroughly familiarize himself with the project and all job related requirements. Each sub-contractor shall cooperate with the General Contractor to verify that all piping and other items are placed in the walls, furred spaces, chases, etc., so there will be no delays in the job.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 OPENINGS

A. Framed, cast or masonry openings for ductwork, equipment or piping are specified under other divisions. Drawings and layout work for exact size and location of all openings are included under this division.

3.2 DUCT DETECTORS

A. Provide and install duct detectors in supply AND return air ductwork at all units supplying above 2,000 CFM.

3.3 AIR FILTERS AND PIPE STRAINERS

A. Immediately prior to substantial completion of the project, inspect, clean and service air filters and strainers. Replace air filters once test and balance has been completed.

3.4 LUBRICATION, REFRIGERANT AND OIL

A. Provide a complete charge of correct lubricant for each item of equipment requiring lubrication.

B. Provide a complete and working charge of proper refrigerant, free of contaminants, into each refrigerant system. After each system has been in operation long enough to ensure completely balanced conditions, check the charge and modify for proper operation as required.

C. Provide a complete charge of special oil for refrigeration use, suitable for operation with refrigerant, in each system.

3.5 HOUSEKEEPING PADS

A. Provide equipment housekeeping pads under all floor mounted and ground mounted HVAC equipment, and as shown on the drawings.

B. Concrete work as specified in Division 3.

C. Concrete pads:
   1. 4" high, rounded edges, minimum 2500 psi unless otherwise indicated on the drawings
   2. Chamfer strips at edges and corner of forms.
   3. Smooth steel trowel finish.
   4. Doweled to existing building slab

D. Install concrete curbs around duct penetrations or multiple pipe penetrations.

3.6 INSTRUCTION OF OWNER'S PERSONNEL

A. Prior to final inspection, conduct an on-site training program to instruct the Owner's operating personnel in the operation and maintenance of the mechanical systems.
   1. Provide the training during the Owner's regular working day.
   2. The Instructors shall each be experienced in their phase of operation and maintenance of building mechanical systems and with the project.

B. Before proceeding with the on-site training program, submit the program syllabus; proposed time and dates; and other pertinent information for review and approval.
   1. One copy to the Owner.
   2. One copy to the Architect/Engineer.

C. The Owner will provide a list of personnel to receive instructions and will coordinate their attendance at the agreed upon times.

D. Use the operation and maintenance manuals as the basis of instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shut down of each item of equipment.

F. Demonstrate equipment functions (both individually and as part of the total integrated system).

G. Prepare and insert additional data in the operating and maintenance manuals when the need for additional data becomes apparent during instructions.

H. Submit a report within one week after completion of the training program that instructions have been satisfactorily completed. Give time and date of each demonstration and hours devoted to the demonstration, with a list of people present.

I. At the conclusion of the on-site training program, have the person designated by the Owner sign a certificate to certify that he/she has a proper understanding of the system, that the demonstrations and instructions have been satisfactorily completed, and the scope and content of the operating and maintenance manuals used for the training program are satisfactory.

J. Provide a copy of the report and the certificate in an appropriately tabbed section of each Operating and Maintenance Manual.

3.7 EQUIPMENT IDENTIFICATION and PIPE IDENTIFICATION/DIRECTIONAL ARROWS

A. Provide a laminated engraved plastic nameplate on each piece of equipment and starter.
   1. Designation approved by Architect/Engineer.
   2. Equipment includes, but is not limited to, air handling units, fan coil units, variable volume boxes, fans, pumps, boilers and chillers.
   3. Submit schedule of equipment to be included and designations.

B. Provide nameplates with 1/2" high letters and fastened with epoxy or screws.

C. Provide and install industry standard color-coordinated pipe system identification and fluid directional arrows at each change in piping direction and/or at a minimum every 10 feet of straight run of piping.

3.8 OBSTRUCTIONS

A. The drawings indicate certain information pertaining to surface and subsurface obstructions which has been taken from available drawings. Such information is not guaranteed, however, as to accuracy of location or complete information.
   1. Before any cutting or trenching operations are begun, verify with Owner's representative, utility companies, municipalities, and other interested parties that all available information has been provided.
   2. Should obstruction be encountered, whether shown or not, alter routing of new work, reroute existing lines, remove obstruction where permitted, or otherwise perform whatever work is necessary to satisfy the purpose of the new work and leave existing services and structures in a satisfactory and serviceable condition.

B. Assume total responsibility for and repair any damage to existing utilities or construction, whether or not such existing facilities are shown.

3.9 PROTECTION

A. Protect work, equipment, fixtures, and materials. At work completion, work must be clean and in original manufacturer's condition.

B. Use of permanent HVAC systems (including ductwork) for temporary air conditioning for finishes shall not be permitted unless approved by the engineer and/or owner in writing. In no case shall the equipment be utilized without the building envelope being sealed (exterior and roof vapor barriers, windows, doors, thresholds, etc.).

3.10 INDOOR AIR QUALITY

A. All equipment and ductwork shall be installed to allow sufficient space for testing, maintenance, and commissioning functions. Access doors or panels shall be installed in ventilation equipment, ductwork, and plenum enclosures for inspection and cleaning of outdoor air intakes, mixing plenums, up and downstream of coils, filters, drain pans and fans.

B. Practice source control and eliminate potential contaminants in material selection, installation, and maintenance.

C. Provide installation and disposal instructions for all materials and chemicals that are potential contaminants.

D. Obtain and conform to the requirements of the Material Safety Data Sheets (MSDSs) in the use of materials.

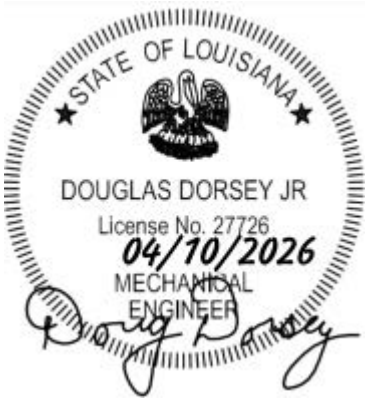
E. Utilize manufacturer’s recommendations and provide installation instructions for all chemicals, compounds, and potential contaminants including pre-installation degassing if required.

F. Ventilate completed building prior to final completion using no less than design outside air for at least 48 hours before occupancy.

G. Make provisions for controls to prevent the entry of air contaminants into the HVAC air distribution system.

H. Steps shall be taken to ensure that the HVAC system continues to function effectively and are not damaged or contaminated during construction activities.

END OF SECTION 23 05 00



SECTION 23 05 10

HVAC CONTRACT QUALITY CONTROL

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Contract quality control including workmanship, manufacturer's instructions, mock-ups and demonstrations.

1.2 QUALITY CONTROL PROGRAM

A. Maintain quality control over supervision, subcontractors, suppliers, manufacturers, products, services, site conditions and workmanship to produce work in accordance with contract documents.

1.3 WORKMANSHIP

A. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.

B. Perform work by persons qualified to produce workmanship of specified quality.

C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking. Under no conditions shall material or equipment be suspended from structural bridging.

D. Provide finishes to match approved samples. All exposed finishes shall be approved by the Architect. Submit color samples as required.

1.4 MANUFACTURER'S INSTRUCTIONS

A. Comply with instructions in full detail, including each step, in sequence.

B. Should instruction conflict with Contract Documents, request clarification from Architect / Engineer before proceeding.

1.5 MANUFACTURER'S CERTIFICATES

A. When required in individual Specification Sections, submit manufacturer's certificate in duplicate, certifying that products meet or exceed specified requirements.

1.6 MANUFACTURER'S FIELD SERVICES

A. When required in individual Specification Sections, manufacturer shall provide qualified personnel to observe:
   1. Field conditions.
   2. Condition of installation.
   3. Quality of workmanship.
   4. Start-up of equipment.
   5. Testing, adjusting, and balancing of equipment.

B. Representative shall make written report of observations and recommendations to Architect / Engineer.

PART 2 - PRODUCTS

2.1 REFERENCE APPLICABLE SPECIFICATION SECTIONS.

PART 3 - EXECUTION

3.1 PROTECTION OF EQUIPMENT

A. Do not deliver equipment to the project site until progress of construction has reached the stage where equipment is actually needed or until building is closed in enough to protect the equipment from weather. Equipment allowed to stand in the weather will be rejected, and the Contractor is obligated to furnish new equipment of a like kind at no additional cost to the Owner.

B. Adequately protect equipment from damage after delivery to the project. Cover with heavy tarpaulins, drop cloths or other protective coverings as required to protect from plaster, paint, mortar and/or dirt. Do not cover with plastic materials that may trap condensate and cause corrosion.

END OF SECTION 23 05 10

SECTION 23 05 11

MECHANICAL ALTERATIONS PROJECT PROCEDURES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Inspect and service existing equipment and materials that are to remain or to be reused.

B. Disposal of equipment, materials, or housekeeping pads to be abandoned. Prior to disposal, the Contractor shall verify with the Owner what is to be salvaged by the Owner and what is to become the property of the Contractor.

C. Handling of equipment and materials to be removed.

1.2 QUALITY ASSURANCE

A. Coordination with the Owner prior to the disconnection or shutdown of existing equipment, or the modification of existing operational systems.

1.3 CONTRACT DRAWINGS

A. There is the possibility that existing conditions and devices are affected by the work indicated on the drawings and called for in the specifications (project manual) which do not appear on the drawings. It is the Contractor's responsibility to visit the site and determine all the existing conditions and to consider these existing conditions when making and presenting a proposal, to have a complete proposal.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. Material used to upgrade and repair existing equipment shall conform to that specified.

B. Material used to upgrade and repair existing equipment shall not void existing warranties or listings of the equipment to be upgraded or repaired.

C. Material used to upgrade and repair existing equipment shall be new and shall be of the same manufacturer of the existing equipment, shall be acquired through the existing original equipment manufacturer's approved distribution channels, shall have manufacturer's warranties for the new material being used, and shall be listed for the use intended.

PART 3 - EXECUTION

3.1 INSPECTION

A. Existing materials and equipment indicated on the drawings or in the specifications to be reused shall be inspected for damaged or missing parts. Contractor shall notify the Architect/Engineer, in writing, accordingly.

B. If using materials specified or shown on the drawing voids or diminishes the warranty or operation of remaining equipment or systems, the Contractor shall notify the Architect/Engineer, in writing.

C. Verify field measurements, above and underground piping connections and flows.

D. Demolition Drawings are based on casual field observation and, when available, existing record documents. Report discrepancies to Architect before disturbing existing installation, and immediately after such discrepancies are discovered.

E. Field verify existing conditions and actual utility uses prior to final connections. Existing drawings may not have been available for all required information. Verify actual HVAC supply and return piping connections. Verify flow direction and depth prior to connection to existing plumbing systems.

3.2 APPLICATION

A. Existing materials and equipment indicated on the drawings or in the specifications to be reused shall be cleaned and reconditioned, including cleaning of piping systems and HVAC coils prior to installation and reuse.

B. Material and equipment removed that is not to be salvaged for Owner's use or for reuse on the project shall become the property of the Contractor and be removed from the site.

C. Material or equipment salvaged for Owner's use shall be carefully handled and stored where directed by the Owner or the Architect / Engineer. Relocate material and / or equipment as directed by Owner.

D. Materials and equipment not indicated to be removed or abandoned shall be reconnected to the new system.

E. Materials, equipment and housekeeping pads not to be reused or reconnected shall be removed for Owner's review and salvaged by Contractor.

F. Prior to start of construction, Contractor shall walk areas to be renovated with Owner to identify and document items to be salvaged for Owner's use.

G. Clean and repair existing materials and equipment that remain or are to be reused.

H. Contractor shall utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

3.3 SEQUENCE AND SCHEDULE

A. Coordinate utility service outages with Utility Company, Architect and Owner.

B. Provide additional or temporary valves, piping, ductwork and connections to maintain existing systems in service during construction.

C. Existing HVAC and Plumbing Service: Refer to drawings for work in remodeled areas. Where facilities in these areas are to remain in service, any related work to keep the facilities in operation is specified in this Division. Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Obtain permission from Owner at least 48 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area. Maintain acceptable temperature and humidity control within existing building during renovation activities.

D. Remove and replace existing Mechanical systems and appurtenances as occasioned by new or remodeled construction. Re-establish service that may be interrupted by remodeled construction.

E. Refer to other drawings series for work in remodeled areas. Where facilities in these areas are required to remain in service, any related work required to keep these facilities in operation is specified in this Division.

F. Remove and replace existing piping, grilles, boxes and ductwork coincident with the construction.

G. Remove or relocate existing piping, grilles, ductwork or housekeeping pads as occasioned by new or remodeled construction. Cap unused HVAC or domestic piping and duct beyond the new finish line.

H. Relocate all HVAC and or domestic piping, grilles, boxes and ductwork as required to accommodate new work requiring precedence.

I. Remove concrete housekeeping pad where materials or equipment have been removed.

J. Remove all known utilities which do not provide service to the buildings that remain unless otherwise instructed in the construction documents.

K. Remove existing plumbing or mechanical vent penetrations through roof not to be reused.

3.4 DEMOLITION AND EXTENSION OF EXISTING MECHANICAL WORK

A. The Contractor shall modify, remove, and/or relocate all materials and items so indicated on the drawings or required by the installation of new facilities. All removals and/or dismantling shall be conducted in a manner as to produce maximum salvage. Materials and/or items scheduled for relocation and which are damaged during dismantling or reassembly operations shall be repaired and restored to good operative condition. The Contractor may, at his discretion, and upon approval of the Owner's representative substitute new materials and/or items of like design and quality in lieu of materials and/or items to be relocated.

B. All items to be relocated shall be carefully removed in reverse to original assembly or placement and protected until relocated. The Contractor shall clean, repair, and provide all new materials, fittings, and appurtenances required to complete the relocations and to restore them to good operative order. All relocations shall be performed by workmen skilled in the work and in accordance with standard practice of the trades involved.

C. When items scheduled for relocation and/or reuse are found to be in damaged condition before work has been started on dismantling, the Contractor shall call the attention of the Owner's representative to such items and receive further instructions before removal. Items damaged in repositioning operations are the contractor's responsibility and shall be repaired or replaced by the contractor as approved by the owner's representative, at no additional cost to the Owner.

D. HVAC, Plumbing, piping, ductwork and appurtenances to be removed, salvaged, or relocated shall be removed to points indicated on the drawings, specified, or acceptable to the Owner's representative. Piping and ductwork not scheduled for reuse shall be removed to the points at which reuse is to be continued or service is to remain. Such services shall be sealed, capped, or otherwise tied-off or disconnected in a safe manner acceptable to the Construction Inspector. All disconnections or connections into the existing facilities shall be done in such a manner as to result in minimum interruption of services to adjacent occupied areas. Services to existing areas or facilities that must remain in operation during the construction period shall not be interrupted without prior specific approval of the Owner's representative hereinbefore specified.

E. Repair adjacent construction and finishes damaged during demolition and extension work.

F. Maintain access to mechanical installations that remain active. Modify installation or provide access panel as appropriate.

G. Extend existing installations using materials and methods compatible with existing mechanical installations, or as specified.

H. Existing mechanical piping and devices found to need additional hangers installed should be added at no additional cost to the Owner.

3.5 PROTECTION OF THE WORK

A. Provide adequate temporary support and auxiliary structure as necessary to ensure structural value or integrity of affected portion of work.

B. Provide devices and methods to protect other portions of work from damage.

C. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances and finishes.

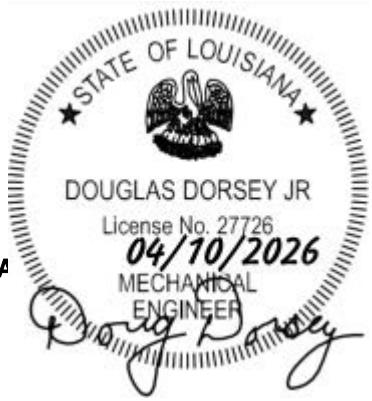
3.6 IDENTIFICATION OF EQUIPMENT IN RENOVATED AREAS

A. Identification of Equipment: Provide new identification of all existing equipment to be reused and located within the renovated areas. Do not include the description “existing”. Provide new nameplates for all existing mechanical equipment in renovated areas as specified in Mechanical General Provisions.

3.7 REFRIGERANT DISPOSAL

A. Contractor shall properly dispose of refrigerant from all equipment including refrigerant piping per OSHA, EPA, Federal, State and Local Codes.

END OF SECTION 23 05 11



SECTION 23 05 12

SHOP DRAWINGS, COORDINATION DRAWINGS & PRODUCT DATA

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Prepare submittals as required by these specifications as outlined below.

B. The term submittal, as used herein, refers to all:
   1. Shop Drawings
   2. Coordination Drawings
   3. Product data

C. Submittals shall be prepared and produced for:
   1. Distribution as specified
   2. Inclusion in the Operating and Maintenance Manual, as specified, in the related section

1.2 SHOP DRAWINGS

A. Present drawings in a clear and thorough manner. Identify details by reference to sheet and detail, schedule, or room numbers shown on Contract Drawings.

B. Show all dimensions of each item of equipment on a single composite Shop Drawing. Do not submit a series of drawings of components.

C. Identify field dimensions; show relationship to adjacent features, critical features, work, or products.

D. Submit shop drawings in plan, elevation and sections, showing equipment in mechanical equipment areas.

1.3 COORDINATION DRAWINGS

A. Present in a clear and thorough manner. Title each drawing with project name. Identify each element of drawings by reference to sheet number and detail, or room number of contract documents. Minimum drawing scale: ¼" = 1'-0".

B. Prepare coordination drawings to coordinate installations for efficient use of available space, for proper sequence of installation, and to resolve conflicts. Coordinate with work specified in other sections and other divisions of the specifications.

C. For each mechanical room and for each outside equipment pad where equipment is located, submit plan and elevation drawings. Show:
   1. Actual mechanical equipment and components to be furnished
   2. Service clearance
   3. Relationship to other equipment and components
   4. Roof drains and leader piping
   5. Fire protection piping and equipment

D. Identify field dimensions. Show relation to adjacent or critical features of work or products.

E. Related requirements:
   1. Ductwork shop drawings
   2. Coordination drawing specified in Division 26

F. Submit shop drawings in plan, elevation and sections, showing equipment in mechanical equipment areas.

G. Gas piping sketch indicating proposed location of piping prior to proceeding with the installation.

1.4 PRODUCT DATA AND INSTALLATION INSTRUCTION

A. Submit only pages which are pertinent to the project. All options which are indicated on the product data shall become part of the contract and shall be required whether specified are not.

B. Mark each copy of standard printed data to identify pertinent products, referenced to specification section and article number.

C. Show reference standards, performance characteristics and capacities; wiring and piping diagrams and controls; component parts; finishes; dimensions and required clearances.

D. Modify manufacturer's standard schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the work. Delete information not applicable.

E. Mark up a copy of the specifications for the product. Indicate in the margin of each paragraph the following: COMPLY, DO NOT COMPLY, or NOT APPLICABLE. Explain all DO NOT COMPLY statements.

F. Provide a separate transmittal for each submittal item. Transmittals shall indicate product by specification section name and number. Separate all submittals into appropriate specification section number. Do not combine specification sections.

1.5 MANUFACTURERS INSTRUCTIONS

A. Submit Manufacturer's instructions for storage, preparation, assembly, installation, start-up, adjusting, calibrating, balancing and finishing.

1.6 CONTRACTOR RESPONSIBILITIES

A. Review submittals prior to transmittal.

B. Determine and verify:
1. Field measurements
2. Field construction criteria
3. Manufacturer's catalog numbers
4. Conformance with requirements of Contract Documents

C. Coordinate submittals with requirements of the work and of the Contract Documents.

D. Notify the Architect/Engineer in writing at time of submission of any deviations in the submittals from requirements of the Contract Documents.

E. Do not fabricate products, or begin work for which submittals are specified, until such submittals have been produced and bear contractor's stamp. Do not fabricate products or begin work scheduled to have submittals reviewed until return of reviewed submittals with Architect / Engineer's acceptance.

F. Contractor's responsibility for errors and omissions in submittals is not relieved whether Architect / Engineer reviews submittals or not.

G. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved whether Architect/Engineer reviews submittals or not, unless Architect / Engineer gives written acceptance of the specific deviations on reviewed documents.

H. Submittals shall show sufficient data to indicate complete compliance with Contract Documents:
   1. Proper sizes and capacities
   2. That the item will fit in the available space in a manner that will allow proper service
   3. Construction methods, materials and finishes

I. Schedule submissions at least 15 days before date reviewed submittals will be needed.

1.7 SUBMISSION REQUIREMENTS

A. Make submittals promptly in accordance with approved schedule, and in such sequence as to cause no delay in the Project or in the work of any other Contractor.

B. Number of submittals required:
   1. Shop Drawings and Coordination Drawings: Submit one reproducible transparency and three opaque reproductions.
   2. Product Data: Submit the number of copies which the contractor requires, plus those which will be retained by the Architect/Engineer.

C. Accompany submittals with transmittal letter, in duplicate, containing:
   1. Date
   2. Project title and number
   3. Contractor's name, address and contact number.
   4. The number of each Shop Drawing, Project Datum and Sample submitted
   5. Other pertinent data

D. Submittals shall include:
   1. The date of submission
   2. The project title and number
   3. Contract Identification
   4. The names of:
      a. Contractor
      b. Subcontractor
      c. Supplier
      d. Manufacturer
   5. Identification of the product
   6. Field dimensions, clearly identified as such
   7. Relation to adjacent or critical features of the work or materials
   8. Applicable standards, such as ASTM or federal specifications numbers
   9. Identification of deviations from contract documents
   10. Suitable blank space for General Contractor and Architect/Engineer stamps
   11. Contractor's signed and dated Stamp of Approval

E. Coordinate submittals into logical groupings to facilitate interrelation of the several items:
   1. Finishes which involve Architect/Engineer selection of colors, textures or patterns
   2. Associated items which require correlation for efficient function or for installation

1.8 SUBMITTAL SPECIFICATION INFORMATION

A. Every submittal document shall bear the following information as used in the project manual:
   1. The related specification section number
   2. The exact specification section title

B. Submittals delivered to the Architect/Engineer without the specified information will not be processed. The Contractor shall bear the risk of all delays, as if no submittal had been delivered.

1.9 RESUBMISSION REQUIREMENTS

A. Make re-submittals under procedures specified for initial submittals.
   1. Indicate that the document or sample is a re-submittal
   2. Identify changes made since previous submittals

B. Indicate any changes which have been made, other than those requested by the Architect / Engineer.

1.10 CONTRACTOR'S STAMP OF APPROVAL

A. Contractor shall stamp and sign each document certifying to the review of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the work and of Contract Documents.

B. Contractor's stamp of approval on any submittal shall constitute a representation to Owner and Architect/Engineer that Contractor has either determined and verified all quantities, dimensions, field construction criteria, materials, catalog numbers, and similar data or assumes full responsibility for doing so, and that Contractor has reviewed or coordinated each submittal with the requirements of the work and the Contract Documents.

C. Do not deliver any submittals to the Architect/Engineer that do not bear the Contractor's stamp of approval and signature.

D. Submittals delivered to the Architect/Engineer without Contractor's stamp of approval and signature will not be processed. The Contractor shall bear the risk of all delays, as if no submittal had been delivered.

1.11 ARCHITECT / ENGINEER REVIEW OF IDENTIFIED SUBMITTALS

A. The Architect / Engineer will:
   1. Review identified submittals with reasonable promptness and in accordance with schedule
   2. Affix stamp and initials or signature, and indicate requirements for re-submittal or approval of submittal
   3. Return submittals to Contractor for distribution or for resubmission

B. Review and approval of submittals will not extend to design data reflected in submittals which is peculiarly within the special expertise of the Contractor or any party dealing directly with the Contractor.

C. Architect / Engineer's review and approval is only for conformance with the design concept of the project and for compliance with the information given in the contract.
   1. The review shall not extend to means, methods, sequences, techniques or procedures of construction or to safety precautions or programs incident thereto.
   2. The review shall not extend to review of quantities, dimensions, weights or gauges, fabrication processes or coordination with the work of other trades.
   3. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

1.12 SUBSTITUTIONS

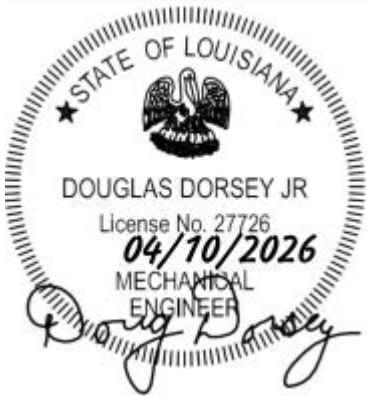
A. Do not make requests for substitution employing the procedures of this Section.

B. The procedure for making a formal request for substitution is specified in Div. 1.

PART 2 - PRODUCTS - NOT USED.

PART 3 - EXECUTION - NOT USED.

END OF SECTION 23 05 12



SECTION 23 05 13

ELECTRICAL PROVISIONS OF HVAC WORK

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Electrical provisions to be provided as mechanical work are indicated in other Division 23 sections, on drawings, and as specified.

B. Types of work, normally recognized as electrical but provided as mechanical, specified or partially specified in this Section, include but are not necessarily limited to the following:
   1. Motors for mechanical equipment.
   2. Starters or Variable Frequency Drives (VFD's) for motors of mechanical equipment.
   3. Wiring from motors to disconnect switches or junction boxes for motors of mechanical equipment, but only where specifically indicated to be furnished integrally with equipment.
   4. Wiring of field-mounted float control switches, flow control switches, and similar mechanical-electrical devices provided for mechanical systems, to equipment control panels.
   5. Wiring/interlocking of duct-mounted smoke detectors for shutdown of air handling equipment when a fire alarm system is not specified.
   6. Providing and installing duct-mounted smoke detectors.
   7. Wiring of oil pump, vibration and oil level limit switches for cooling towers.
   8. Refrigerant monitor/sensor/alarming and field installed visual/audible display alarms.
   9. Pipe heat tracing.
   10. Cooling tower vibrations switch/interlock/reset.
   11. Field interlock wiring from chiller: flow switches, pump auxiliary contactors, pump start/stop.
   12. Power supply 120 VAC and control signal from chiller control panel to condenser water flow control valve installed in piping leaving chiller.
   13. Wiring of all related circulating water system chemical treatment devices.
       a. Low voltage electric contacting water meter.
       b. Solenoid valve/blow-down assembly.
   14. Radiant heater timer switches and/or thermostats.
   15. Low Voltage thermostat wiring.

C. Refer to Division 23 Controls Sections for related control system wiring.

D. Refer to Division 23 sections for specific individual mechanical equipment electrical requirements.

E. Refer to Division 26 sections for motor starters and controls not furnished integrally with mechanical equipment.

F. Refer to Division 26 sections for junction boxes and disconnect switches required for motors and other electrical units of mechanical equipment.

1.2 RELATED WORK

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Specification Sections, apply to work of this Section.

1.3 QUALITY ASSURANCE

A. Wherever possible, match elements of electrical provisions of mechanical work with similar elements of electrical work specified in Division 26 sections for electrical work not otherwise specified.

B. For electrical equipment and products, comply with applicable NEMA standards, and refer to NEMA standards for definitions of terminology. Comply with National Electrical Code (NFPA 70) for workmanship and installation requirements.

1.4 SUBMITTALS

A. Include in listing of motors, voltage, notation of whether motor starter is furnished or installed integrally with motor or equipment containing motors.

PART 2 - PRODUCTS

2.1 MOTORS

A. Provide motors for mechanical equipment manufactured by one of the following:
   1. Baldor Electric Company.
   2. Century Electric Div., Inc.
   3. General Electric Co.
   4. Louis Allis Div.; Litton Industrial Products, Inc.
   5. Lincoln Electric
   6. Marathon Electric Mfg. Corp.
   7. Reliance Electric Co.
   8. Westinghouse Electric Corp.
   9. WEG

B. Motor Characteristics. Except where more stringent requirements are indicated, and except where required items of mechanical equipment cannot be obtained with fully complying motors, comply with the following requirements for motors of mechanical work:

C. Temperature Rating. Rated for 40 Degrees C environment with maximum 50 Degrees C temperature rise for continuous duty at full load (Class A Insulation).

D. Provide each motor capable of making starts as frequently as indicated by automatic control system, and not less than 5 starts per hour for manually controlled motors.

E. Phases and Current Characteristics. Provide squirrel-cage induction polyphase motors for 3/4hp and larger and provide capacitor-start single-phase motors for 1/2hp and smaller, except 1/6hp and smaller may, at equipment manufacturer's option, be split-phase type. Coordinate current characteristics with power specified in Division 26 sections, and with individual equipment requirements specified in other Division 23 requirements. For 2-speed motors provide 2 separate windings on polyphase motors. Do not purchase motors until power characteristics available at locations of motors have been confirmed, and until rotation directions have been confirmed.

F. Service Factor. 1.15 for polyphase motors and 1.35 for single-phase motors.

G. Motor Construction. Provide general purpose, continuous duty motors, Design "B" except "C" where required for high starting torque.
   1. Frames. NEMA #56.
   2. Bearings are to be ball or roller bearings with inner and outer shaft seals, regreasable except permanently sealed where motor is inaccessible for regular maintenance. Where belt drives and other drives produce lateral or axial thrust in motor, provide bearings designed to resist thrust loading. Refer to individual section of Division 23 for fractional-hp light-duty motors where sleeve-type bearings are permitted.
   3. Except as indicated, provide open drip-proof motors for indoor use where satisfactorily housed or remotely located during operation, and provide guarded drip-proof motors where exposed to contact by employees or building occupants. Provide weather-protected Type I for outdoor use, Type II where not housed. Refer to individual sections of Division 23 for other enclosure requirements.
   4. Provide built-in thermal overload protection and, where indicated, provide internal sensing device suitable for signaling and stopping motor at starter.
   5. Noise Rating: Provide "Quiet" rating on motors.

H. All motors shall be premium efficiency.

I. Provide an inverter duty motor and shaft grounding rings on all equipment that utilizes a variable frequency drive.

2.1 EQUIPMENT FABRICATION

A. Fabricate mechanical equipment for secure mounting of motors and other electrical items included in work. Provide either permanent alignment of motors with equipment, or adjustable mountings as applicable for belt drives, gear drives, special couplings and similar indirect coupling of equipment. Provide safe, secure, durable, and removable guards for motor drives. Arrange for lubrication and similar running-maintenance without removal of guards.

2.2 GENERAL REQUIREMENTS – SHAFT GROUNDING RINGS

A. All motors operated on variable frequency drives shall be equipped with a maintenance-free, conductive microfiber shaft grounding ring to meet NEMA MG-1, 3.4.4.4.3 requirements, with a minimum of two rows of circumferential microfibers to discharge damaging shaft voltages away from the bearings to ground. SGR's Service Life: Designed to last for service life of motor. Provide AEGIS SGR Conductive MicroFiber Shaft Grounding Ring, or approved equal.

B. Application Note: Motors up to 100 HP shall be provided with one shaft ground ring installed on either the drive end or non-drive end. Motors over 100 HP shall be provided with an insulated bearing on the non-drive end and a shaft grounding ring on the drive end of the motor with the exception of line contact bearings in the drive end of the machine. In this instance the line contact bearing must be electrically insulated and the AEGIS Bearing Protection Ring installed on the opposite drive end of the motor. Grounding rings shall be provided and installed by the motor manufacturer's recommendations.

PART 3 - EXECUTION

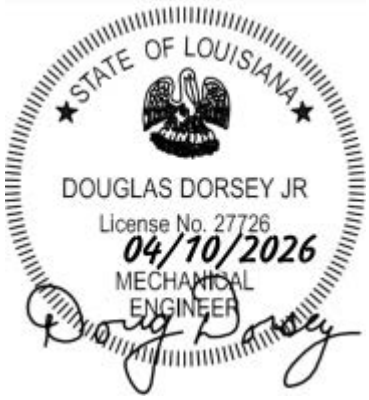
3.1 INSTALLATION

A. Install motors on motor mounting systems in accordance with motor manufacturer's instructions, anchored to resist torque, drive thrusts, and other external forces inherent in mechanical work. Secure sheaves and other drive units to motor shafts with keys and Allen set screws on flat surface of shaft. Unless otherwise indicated, set motor shafts parallel with machine shafts.

B. Verify voltage with Electrical Plans.

C. Provide and Install duct detectors on supply and return ductwork on all units supplying 2,000 CFM and above.

END OF SECTION



SECTION 23 05 17

HVAC ACCESS DOORS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish and install access doors in wall or ceiling locations as required or shown for access to valves, controls, fire dampers, air distribution devices and other equipment requiring maintenance, adjustment or operation.

PART 2 - PRODUCTS

2.1 NON-FIRE RATED ACCESS DOORS

A. 16-Gauge frames

B. 14-gauge steel panels

C. Continuous fully concealed hinges

D. Flush screwdriver cam lock & cylinder lock for Owner selection

E. Automatic closing and latching mechanism

F. Prime coat finish

G. Brushed satin stainless steel finish for gypboard ceiling installation

H. Material suitable for wall and/or ceiling mounting

2.2 FIRE RATED ACCESS DOORS

A. UL listed, 1-1/2 hour Label “B”, access doors

B. 16-Gauge stainless steel

C. 20-Gauge insulated sandwich-type door panel.

D. Two inch thick with fire rated insulation

E. Continuous fully concealed hinge

F. Automatic closing and latching mechanism

G. Knurled knob and recessed key operation for Owner selection

H. Interior latch release slide for opening from inside

I. Prime coat finish

J. Material suitable for wall and/or ceiling mounting

2.3 ACCEPTABLE MANUFACTURERS

A. Milcor

B. MIFAB

C. Acudor

D. Elmdor

PART 3 - EXECUTION

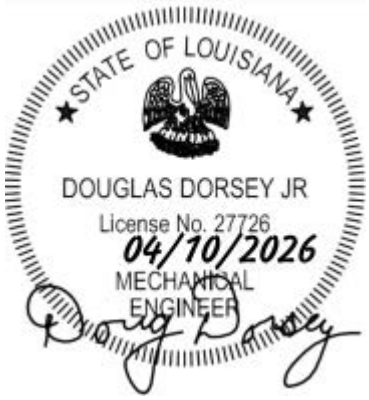
3.1 INSTALLATION

A. Access doors specified in Division 23 will be installed by other crafts. Not all required access doors are shown. Coordinate with the Contractor to locate access doors for ease of operation and maintenance of concealed equipment.

B. Installation shall be in accordance with the manufacturer's printed instructions.

C. Minimum size required:
   1. 36" x 24" for Mechanical HVAC equipment related items
   2. 18" x 18" for electrical related items

END OF SECTION 23 05 17



SECTION 23 05 23

HVAC VALVES, STRAINERS AND VENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. HVAC Valves

B. Pipe strainer and suction diffusers.

PART 2 - PRODUCTS

2.1 VALVES

A. Pressure Ratings:
   1. Unless otherwise indicated, use valves suitable for 125 minimum psig working steam pressure (WSP) and 450°F.
   2. The pressure temperature rating of valves shall be not less than the design criteria applicable to components of the system.

B. Butterfly Valves
   1. Butterfly valves shall conform to MSS-SP67.
   2. Liners, inserts and discs shall be suitable for the intended service.
   3. Valves shall have a full lug type body designed for installation between ANSI standard flanges, and shall be rated at full working pressure with downstream flange removed.

C. Balancing Valves
   1. Provide balancing valves with:
      a. Corrosion resistant plug with resilient seal when required.
      b. O-ring stem seal.
      c. Permanently lubricated, corrosion resistant bearings.
   2. Connections
      a. Through 2" pipe size use threaded connections.
      b. For valves 2-1/2" pipe size and larger shall be provided with 150 psig flange connections.
   3. Provide each valve with:
      a. Memory stop.
      b. Plastic drip cap.
      c. 1/8" gauge tap.

D. Ball Valves
   1. Provide ball valves with:
      a. Blowout proof stem.
      b. Full size port, 316 stainless steel ball and stem.
      c. Cast bronze body.
      d. Threaded ends.
   2. Seat, seals, thrust washers and packing shall be suitable for the intended service.
   3. Service rating:
      a. 150 psi saturated steam.
      b. 600 psi WOG.
   4. Where piping is insulated, ball valves shall be equipped with 2” extended handles of non-thermal conductive material. Provide a protective sleeve that allows operation of the valve without breaking the vapor seal or disturbing the insulation.
   5. Provide with memory stop for balancing valves.

E. Valve Connections
   1. Provide valves suitable to connect to adjoining piping as specified for pipe joints. Use pipe size

valves. Sweated joints are not allowed.
2. Thread pipe sizes 2" and smaller.
3. Flange pipe sizes 2-1/2" and larger.
4. Use screw to solder adapters for copper tubing.
5. Use grooved body valves with mechanical grooved jointed piping.

F. Valve Operators
1. Where butterfly valves are provided:
a. Provide gear operators on valves 6" and larger.
b. Where valves are located 7' or more above the finished floor in equipment room areas provide chain-operated sheaves. Extend chains to about 5' above floor and hook to clips, arrange to clear walking space.
c. Lever lock handle with toothed plate for shut-off service and infinitely adjustable handle with lock and nut and memory stop for throttling service on valves 4" and smaller.
d. Provide worm gear operators on discharge side of pumps for balancing, for all sizes of valves.
e. All valves 2-1/2" and larger provided by Milwaukee Valve shall be provided with gear operators.
f. Valves 6" and larger shall be 120 volt operated. Valves 5" and below shall be low voltage valves.

G. Acceptable Manufacturers
1. Dezurik
2. Crane
3. Nibco
4. Keystone
5. Milwaukee Valve

H. Check Valves
1. Bronze body, 2" and smaller, bronze disc (Teflon disc for steam service), regrinding swing check, screw-in cap, threaded connection.
2. Iron body, 2-1/2" and larger, bronze trim, non-slam: stainless steel pins and springs, and bronze plate or bronze mounted, regrind-renew check, bronze seat ring and disc. Provide either wafer or threaded lug.
3. Acceptable Manufacturers
a. Mission Duochek
b. Nibco
c. Keystone
d. Milwaukee Valve

I. Provide valves of same manufacturer throughout where possible.

J. Provide valves with manufacturer's name and manufacturing location, duty and pressure rating clearly marked on outside of body.

K. Where valves are installed in insulated piping, provide with extended neck so valve operator and stop plate clears the full thickness insulation.

L. Provide valve, seat and trim materials suitable for the intended service.

M. Provide memory stops for all valves used for throttling service. Valves for throttling service shall be butterfly, plug, caged or ball type.

N. Condenser Water Basin Float Valve:
1. Ductile Iron valve, body and cover
2. Stainless steel trim
3. Fully adjustable high and low level settings
4. Stainless steel float, float linkage and float rod

5. Flow clean strainer
6. CV Flow Control for opening and closing
7. ASTM A 536, B16.42, 150# Class
8. Stilling well
9. Acceptable Manufacturer: CLA-VAL

2.2 PIPE SYSTEMS STRAINERS

A. Body:
1. "Y" pattern or basket as shown on the drawings.
2. Line size.
3. Threaded strainer blow down port.
4. ASTM A #126 Class B Cast Iron Body.

B. Construction:
1. 2" size and smaller with screw connections rated 400 psi WOG.
2. Over 2" size with flanged connections, rated 125 psi WOG.

C. Fabricate screens of Monel or type 304 stainless steel:
1. With 20 mesh woven wire in piping systems through 2".
2. With 0.45 perforations in piping systems 2-1/2" and 3".
3. With 0.125 perforations in piping systems 4" and larger.

D. Start-up:
1. Provide an additional fine mesh disposable screen for use during start-up operations.
2. Remove after 30 days.
3. Attach to piping for owners review.

E. Acceptable Manufacturers
1. Crane
2. Keckley
3. Zurn
4. Mueller
5. McAlear
6. Muesco

2.3 SUCTION DIFFUSER

A. For each pump as shown on the drawing, provide an angle type suction diffuser. Body is to fit both the pump inlet and suction pipe size.

B. Components:
1. Inlet straightening vanes.
2. Removable end cap.
3. Gauge ports.
4. Threaded strainer blow down port.
5. Adjustable support foot.
6. Removable magnetic insert.

C. The screen shall be as specified for pipe system strainers.

D. Provide an additional fine mesh disposable strainer for use during start up operations.
1. Remove after 30 days operation and all flushing is complete.
2. Attach to piping for owners review.

E. Construction:
1. 2" size and smaller with screw connections rated 400 psi WOG.

2. Over 2" size with flanged connections, rated 125 psi WOG.

F. Fabricate screens of Monel or type 304 stainless steel:
1. With 20 mesh woven wire in piping systems through 2".
2. With 0.045 perforations in piping systems 2-1/2" and 3".
3. With 0.125 perforations in piping systems 4" and larger.

2.4 VALVE SCHEDULE

A. Hydronic Service
1. Chilled Water Service
a. Ball Valves up to 2": Nibco T-585-70-66 w/Nib-Seal insulated Handle
b. Butterfly Valve 2-1/2" and larger: Nibco LD - 2000
Keystone Figure 222
2. Heating & Condenser Water Service
a. Ball Valves up to 2": Nibco T-585-70-66
b. Butterfly Valve 2-1/2" and larger: Nibco LD - 2000
Keystone Figure 222
3. Check Valve:
a. Nibco Check Valve: T - 413 - B
b. Nibco Check Valve 2-1/2" and larger: F - 918 - B
c. Nibco Check Valve 2-1/2" and larger: W - 920 -W (Wafer)
d. Keystone Check 2-1/2" and larger: FIQ 810

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install valves with stems upright or horizontal, not inverted.

B. Install valves for shut-off and isolating service at each piece of equipment, at vertical risers, and where shown on the drawings.

C. Use butterfly valves and ball valves in circulating water systems, for balancing duty. Provide infinite position gear operator with memory stop.

D. Provide drain valves at main shut-off valves and low points of piping and apparatus so the systems can be entirely drained.
1. 1" valve for pipes 6" and larger.
2. 3/4" valve for pipes smaller than 6".
3. Terminate with pipe plug.
4. Drain valves shall be ball valves.

E. Where valves are installed in insulated pipe, valve operator shall have an insert so the lever or handle will not damage the insulation. Install handles so the lever or handles will not damage the insulation.

F. Provide clearance for installation of insulation and access to valves.

G. Provide access where valves are not exposed.

H. Provide float valves / stilling wells in cooling tower or condenser water basins for water level control. Provide stilling wells around float valve to prevent turbulence ripples or wind interference.

3.3 PIPE SYSTEMS STRAINERS

A. Provide an additional fine mesh disposable strainer for use during start up operations.
1. Remove after 30 days operation and all flushing is complete.
2. Attach to piping for owners review.

B. Provide strainer in supply piping for all coil connections.

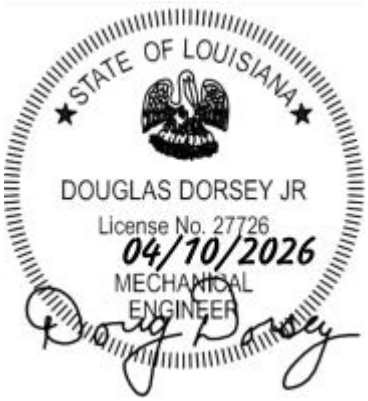
C. Provide strainer in condenser water piping entering chiller.

3.4 WATER SYSTEM AIR VENTS

A. Provide manual air vents at high points and at any other air pockets of closed circulating pipe systems. Extend 3/8" hard drawn copper tubing discharge drains to nearest floor or hub drain. Provide 1/4" Ball Valve as specified.

B. Where high point vents are not readily accessible provide additional valves at vent termination.

END OF SECTION 23 05 23



SECTION 23 05 93

TESTING, BALANCING AND ADJUSTING (TAB) OF ENVIRONMENTAL SYSTEMS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Preliminary measurement and documentation of existing and new airflow systems for 1st and 2nd floor air handling units and associated diffusers/grilles.

B. Balance, adjust and test the air distribution system (including the exhaust system).

1.2 RELATED SECTIONS

A. COORDINATION OF TESTING AND BALANCING

1.3 PAYMENT PROCEDURES

A. The work of this Section of the Specifications shall bid the project directly to the MECHANICAL Contractor.

1.4 SUBMITTALS

A. History of the TAB organization.

B. Agency certification.

C. Personnel qualifications.

D. TAB data forms.

E. Instrumentation list.

F. Name of the project supervising engineer.

G. Name and address and contact person of five successfully completed projects of similar size and scope.

H. To perform required professional services, the balancing agency shall have a minimum of one test and balance engineer certified by the Associated Air Balance Council.

1.5 TAB FIRM QUALIFICATIONS

A. The organization performing the work shall be a Certified member in good standing of the (AABC) Associated Air Balance Council.

B. Able to furnish evidence of having contracted for and completed not less than five systems of comparable size and type that have served their Owners satisfactorily for not less than five years.

C. A specialist in this field and have the personnel, experience, training, skill, and the organization to perform the work.

D. The balancing agency shall furnish all necessary calibrated instrumentation to adequately perform the specified services. An inventory of all instruments and devices in possession of the balancing agency may be required by the engineer to determine the balancing agency's performance capability.

E. The balancing agency shall have operated for a minimum of five years under its current name.

F. Personnel:
   1. The project supervisor shall be a Professional Engineer and have:
      a. Extensive knowledge of the work involved.
      b. At least five years of experience conducting tests of the type specified.
      c. This test and balance engineer shall be responsible for the supervision and certification of the total work herein specified.
   2. All work shall be conducted under the direct supervision of the supervising engineer.
   3. Technicians shall be trained and experienced in the work they conduct.

2.6 WARRANTY

A. Provide (AABC) guarantee in writing.

B. Extended warranty.
   1. Include an extended warranty of 1 year after completion of test and balance work, during which time the Architect/Engineer may request a retest or resetting of any outlet or other items as listed in the test report.
   2. Provide technicians and instruments to assist the Architect/Engineer in making any tests he may require during this period.
   3. The balancing agency shall perform an inspection of the HVAC system during the opposite season from that which the initial adjustments were made. The balancing agency shall make any necessary modifications to the initial adjustments to produce optimum system operation.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.1 TAB TOLERANCES

A. The water, outside air, supply air, return air, and exhaust air for each system shall be adjusted to within +/- 5% of the value scheduled on the drawings.

3.2 SITE VISITS

A. During construction, the balancing agency shall inspect the installation of the piping systems, sheetmetal work, temperature controls, energy management system, and other component parts of the heating, ventilating, and air conditioning systems. One inspection shall take place when 60% of the ductwork is installed and another inspection shall take place when 90% of the equipment is installed. The balancing agency shall submit a brief written report of each inspection to the architect and engineer.

B. Upon completion of the installation and start-up of the mechanical equipment by the mechanical contractor, the balancing agency shall test and balance the system components to obtain optimum conditions in each conditioned space of the building. If construction deficiencies are encountered that preclude obtaining optimum conditions, and the deficiencies cannot be corrected by the mechanical contractor within a reasonable period of time, the balancing agency shall cease testing and balancing services and advise the architect, engineer, general contractor and owner, in writing, of the deficiencies.

C. Note proper piping installation, location of valves, and flow measuring instruments.

D. Make one series of visits, phased as required by construction progress, prior to installation of the ceiling. Note proper installation of balancing dampers.

E. Continue the site visits up to completion of project. In each succeeding report, list corrections made from previous reports.

3.3 TESTING INSTRUMENTS

A. Submit a list of all instruments to be used for the test and balance procedures.
   1. Catalog sheets
   2. Certificate of last calibration
   3. Calibration within a period of six months prior to balancing

B. Testing equipment shall be in good working order and tested for accuracy prior to start of work.

3.4 COORDINATION WITH OTHER SPECIFICATION SECTIONS

A. Review the related ductwork shop drawings and piping shop drawings. Make recommendations concerning suitability with respect to the testing, balancing and adjusting work.

B. Make tests to verify proper placement of the static pressure sensors for the variable air volume fan system control.

C. In cooperation with the work specified in Building Management and Control System section, a systematic listing of the testing and verification shall be included in the final TAB report. The TAB firm shall provide a laptop computer to operate with the Building Management and Control System. Building Management and Control System shall provide all necessary software and special interface cables, as required, to communicate with the DDC system:
   1. Work with the temperature control contractor to ensure the most effective total system operation within the design limitations, and to obtain mutual understanding of the intended control performance.
   2. Verify that all control devices are properly connected.
   3. Verify that all dampers, valves, and other controlled devices, are operated by the intended controller.
   4. Verify that all dampers and valves are in the position indicated by the controller (open, closed or modulating).
   5. Verify the integrity of valves and dampers in terms of tightness of close-off and full open positions. This includes dampers in multizone units, terminal boxes and fire/smoke dampers.
   6. Observe that all valves are properly installed in piping system in relation to direction of flow and location.
   7. Observe the calibration of all controllers.
   8. Verify the proper application of all normally opened and normally closed valves.
   9. Observe the locations of all thermostats and humidistats for potential erratic operation from outside influences such as sunlight, drafts or cold walls.
   10. Observe the location of all sensors to determine whether their position will allow them to sense only the intended temperatures or pressures of the media. Control contractor will relocate as deemed necessary by the Engineer.
   11. Verify that the sequence of operation for any control mode is in accordance with the approved shop drawings and specifications. Verify that no simultaneous heating and cooling occurs.
   12. Verify the correct operation of all interlock systems and installation is per the manufacturer recommendations.
   13. Check all dampers for free operation.
   14. Verify that all controller setpoints meet the design intent.
   15. Perform variable volume system verification to assure the system and its components track with changes from full flow to minimum flow.

D. Upon completion of the testing and balancing, submit three days prior notice that the systems are ready for a running test. A qualified representative of the test and balance organization shall be present, with a representative from the engineer's office, to field verify TAB report readings. Specific and random selections of data recorded in the certified test and balance report will be reviewed.

3.5 INSTRUMENT TEST HOLES

A. When it is required to make holes in the field to measure temperature, static pressure or velocity in the ducts:
   1. Drill holes, plug, and tape external duct insulation.
   2. Repair damaged insulation to Engineer's approval.

3.6 TESTING THE AIR DISTRIBUTION SYSTEM

A. The TAB agency shall perform initial (prior to construction) and final measurement and recordation of existing and new ductwork, dampers, grilles, registers, and diffusers have been installed per design and set full open. The TAB agency shall perform the following TAB procedures in accordance with the AABC National Standards and all results shall be recorded in the TAB report:
   1. Supply Fans:
      a. Fan speeds: Test and adjust fan RPM to achieve design CFM requirements.
      b. Current and Voltage: Test and record motor voltage and amperage. Then, compare data with the nameplate limits to ensure fan motor is not in or above the service factor.
      c. Pitot-Tube Traverse: Perform a Pitot-Tube traverse of the main supply and return ducts, as applicable, to obtain total CFM. If a Pitot-Tube traverse is not practical, an explanation of why a traverse was not made must appear on the appropriate data sheet. Measurements must be recorded with an Inclined Manometer or an Inclined/Vertical Manometer.
      d. Outside Air: Test and adjust the outside air on applicable equipment using a Pitot-Tube traverse. If a Pitot-Tube traverse is not practical, an explanation of why a traverse was not made must appear on the appropriate data sheet. If a traverse is not practical, use the mixed air temperature method, if the inside and outside temperature difference is at least 20°F, or use the difference between Pitot-tube traverse of the supply and return ducts.
      e. Static Pressure: Test and record system static pressure, including the static pressure profile of each supply fan.
   2. All Other Fans:
      a. Fan speeds: Test and adjust fan RPM to achieve design CFM requirements.
      b. Current and Voltage: Test and record motor voltage and amperage. Then, compare data with the nameplate limits to ensure fan motor is not in or above the service factor.
      c. Pitot-Tube Traverse: Perform a Pitot-Tube traverse of the main return ducts, as applicable, to obtain total CFM. If a Pitot-Tube traverse is not practical, an explanation of why a traverse was not made must appear on the appropriate data sheet. Measurements must be recorded with an Inclined Manometer or an Inclined/Vertical Manometer.
      d. Static Pressure: Test and record system static pressure, including the static pressure profile of each return fan.
   3. Terminal Units:
      a. Set and record volume regulators on all terminal boxes to meet design maximum and minimum CFM requirements.
      b. Identification: Identify the type, location, and size of each terminal unit. This information must be recorded on the terminal box data sheets.
   4. Diffusers, Registers and Grilles:
      a. Tolerances: Test, adjust, and balance each diffuser, grille, and register to within 5% of design requirements. Minimize drafts. Observe throws are in direction as indicated on drawings.
   5. Coils (including electric coils):
      a. Air Temperature: Once air flows are set to acceptable limits, take wet bulb (cooling coil only) and dry bulb air temperatures on the entering and leaving side of each coil. Calculate the sensible and latent (cooling coil only) capacity of the coil. Provide information in TAB report.

B. Record preliminary air handler data, including fan RPM and static pressures across filter, fans and coils.

C. Perform a velocity traverse of the main supply ducts using a pitot-tube and inclined manometer to establish initial air delivery. Perform a Pitot-tube traverse of main supply and return ducts, as applicable, to obtain total CFM. If a pitot-tube traverse is not practical, a detailed explanation of why a traverse was not made must appear on the appropriate data sheet.

D. Where air measuring stations are installed, use pitot tube traverse readings to verify and record the correct calibration of the stations output.

E. Make adjustments in fan RPM and damper settings, as required, to obtain design supply air, return air, and outside air.

F. Measure and adjust all supply and return branches to design air delivery.

G. Measure and adjust all diffusers to design air delivery to +/- 5% of design requirements.

H. Make a set of recordings showing final system conditions.

3.7 TAB REPORT

A. The activities described in this specification shall be recorded in a report form; and four individually bound copies shall be provided to the Architect and Engineer. Neatly type and arrange data. Include with the data the date tested, personnel present, weather conditions, nameplate record of the test instruments used and list all measurements taken after all corrections are made to the system. Record all failures and corrective action taken to remedy any incorrect situation. The intent of the final report is to provide a reference of actual operating conditions for the Owner's operations personnel. Provide a "Preface" which shall include a general discussion of the system and any abnormalities or problems encountered.

B. All measurements and recorded readings (of air, water, electricity, etc.) that appear in the report must have been recorded on site by the permanently employed technicians or engineers of the TAB firm.

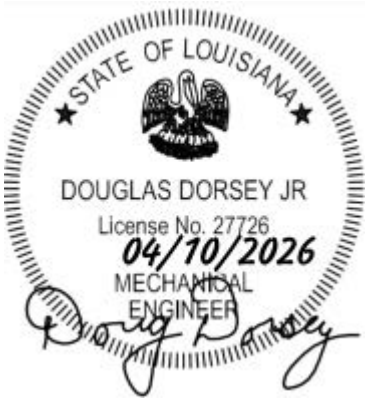
C. Submit reports on forms approved by the engineer that will include the following data as a minimum:
   1. Title Page
      a. Company Name
      b. Company Address
      c. Company telephone number
      d. Project name
      e. Project location
      f. Project Manager
      g. Project Engineer
      h. Project Contractor
      i. Project Identification Number
   2. Summary of the TAB report data
   3. Index
   4. Instrument List
      a. Instrument
      b. Manufacturer
      c. Model
      d. Serial Number
      e. Range
      f. Calibration Date
      g. What test instrument is to be used for:
   5. Fan Data
      a. Location
      b. Manufacturer
      c. Model
      d. Air flow, specified and actual
      e. Total static pressure (total external) specified and actual
      f. Inlet pressure
      g. Discharge pressure
      h. Fan RPM

6. Return Air/Outside Air Data
    a. Identification/location
    b. Design return air flow
    c. Actual return air flow
    d. Design outside air flow
    e. Actual outside air flow
    f. Return air temperature
    g. Outside air temperature
    h. Required mixed air temperature
    i. Actual mixed air temperature
7. Electric Motors
    a. Manufacturer
    b. HP/BHP
    c. Phase, voltage, amperage, nameplate, actual
    d. PM
    e. Service Factor
    f. Starter size, heater elements, rating
8. V-Belt Drive
    a. Identification/location
    b. Required driven RPM
    c. Drive sheave, diameter and RPM
    d. Belt, size and quantity
    e. Motor sheave, diameter and RPM
    f. Center-to-center distance, maximum, minimum and actual
9. 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 correction factor
10. Air Monitoring Station Data
    a. Identification/location
    b. System
    c. Size
    d. Area
    e. Design velocity
    f. Design air flow
    g. Test velocity
    h. Test air flow
11. Air Distribution Test Sheet
    a. Air terminal number
    b. Room number/location
    c. Terminal type
    d. Terminal size
    e. Correction factor
    f. Design velocity
    g. Design air flow
    h. Test (final) velocity
    i. Test (final) air flow
12. Cooling Coil Data
    a. Identification/number
    b. Location
    c. Service
    d. Manufacturer

e. Entering air DB temperature, design and actual
f. Entering air WB temperature, design and actual
g. Leaving air DB temperature, design and actual
h. Leaving air WB temperature, design and actual
i. Entering water temperature, design and actual
j. Leaving water temperature, design and actual
k. Air pressure drop, design and actual
l. Capacity - sensible and latent

13. Heating Coil Data
    a. Identification/number
    b. Location
    c. Service
    d. Manufacturer
    e. Entering air DB temperature, design and actual
    f. Leaving air DB temperature, design and actual
    g. Water pressure 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. Air pressure drop, design and actual
    l. Capacity
14. Electric Coil Data
    a. Identification/number
    b. Location
    c. Service
    d. Manufacturer
    e. Entering air DB temperature, design and actual
    f. Leaving air DB temperature, design and actual
    g. Electrical Characteristics
    h. Capacity

END OF SECTION 23 05 93



SECTION 23 07 13

EXTERNAL DUCT INSULATION

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish and install external insulation on supply, return, exhaust and outside air ductwork.

B. External insulation of concealed and exposed ducts is included in this Section. Internal acoustic duct lining is specified under ductwork and not included in this Section.

1.2 RELATED WORK

A. Division 9 - FINISHES. Painting and Color Coding.

B. Division 23 - MECHANICAL.
   1. Air Handling Units. Internal insulation for air units is specified in the sections on air handling units. The units do not require external insulation.
   2. Internal Duct Liner. Internal duct liner is specified in the section on ductwork.
   3. Insulation. Refer to specific sections on individual insulation types.
   4. Refer to insulation and liner plan detail.

1.3 QUALITY ASSURANCE

A. The intent of insulation specifications is to obtain superior quality workmanship, resulting in an installation that is absolutely satisfactory in both function and appearance. Provide insulation in accordance with the specifications for each type of service and apply as recommended by the manufacturer and as specified.

B. An approved contractor for this work under this Division shall be:
   1. A specialist in this field and have the personnel, experience, training, skill, and the organization to provide a practical working system.
   2. Able to furnish evidence of having contracted for and installed not less than 3 systems of comparable size and type that have served their Owners satisfactorily for not less than 3 years.

C. All duct insulation used on the project inside the building must have a flame spread rating not exceeding 25 and a smoke developed rating not exceeding 50 as determined by test procedures ASTM E84, NFPA 255 and UL 723. These ratings must be as tested on the composite of insulation, jacket or facing, and adhesive. Components such as adhesives, mastics and cements must meet the same individual ratings as the minimum requirements and bear the UL label.

D. Condensation on any insulated system is not approved.

E. Replace insulation damaged by either moisture or other means. Insulation that has been wet, whether dried or not, is considered damaged. Make repairs where condensation is caused by improper installation of insulation. Also repair any damage caused by the condensation.

F. Where existing insulated ductwork or other services are tapped, remove existing insulation back to undamaged sections and replace with new insulation of the same type and thickness as existing insulation. Apply as specified for insulation of the same service.

1.4 APPROVALS

A. Submittals. Submit product data on each insulation type, adhesive, and finish to be used in the work. Make the submittal as specified in Division 1 General Requirements and obtain approval before beginning installation. Include product description, list of materials and thickness for each service and location, and the manufacturer's installation instructions for each product.

B. Sample Application. Make an application of each type of insulation to display the material, quality and application method. Obtain approval of the sample application before proceeding with installation of the work.

PART 2 - PRODUCTS

2.1 INSULATION

A. Glass fiber rigid duct insulation.
   1. Minimum density of 3 pcf, installed R value to be 6.0 (when located in a conditioned plenum) and minimum density of 0.75 pcf, installed R value to be 8.0 (when located in an unconditioned plenum) at 75°F mean, facing of 0.7 mil aluminum foil reinforced with glass yarn mesh and laminated to 40 lbs. fire-resistant Kraft. R-value to be indicated on exterior side of insulation to be verified by City inspector.
   2. Acceptable Manufacturers
      a. Schuller 814 spin-glas FSK.
      b. Owens-Corning Type 703 board RKF.
      c. Knauf 3 PCF FSK.

B. Glass fiber blanket duct insulation.
   1. Minimum density of 1.0 pcf, installed R value to be 6.0 (when located in a conditioned plenum) and minimum density of 0.75 pcf, installed R value to be 8.0 (when located in an unconditioned plenum) at 75°F mean, facing of 0.35 mil foil reinforced with glass yarn mesh and laminated to 40 lbs. fire resistant Kraft. R-value to be indicated on exterior side of insulation to be verified by City inspector.
   2. Acceptable Manufacturers
      a. Manville R-series Microlite FSKL.
      b. Owens-Corning ED100 RKF.
      c. Knauf 1.0 PCF FSK.

C. Fiberglass reinforcing cloth mesh.
   1. Acceptable Manufacturers
      a. Perma Glass Mesh.
      b. Alpha Glass Mesh.
      c. Childers Chil-Glas #10
      d. Foster Mast a Fab
      e. Vimasco.

D. Mastics, sealants, coatings and adhesives.
   1. Acceptable Manufacturers
      a. Childers.
      b. Foster.
      c. Vimasco.

E. Rigid Closed Cell Insulation
   1. Acceptable Manufacturers
      a. Dow Trymer.
      b. Phenolic Foam.

F. Reinforced Foil Tape
   1. Acceptable Manufacturers
      a. Venture 1525CW
      b. 3" FSK
   2. Thickness 6.5 mils
   3. Color: silver

2.2 COATING AND ADHESIVE

A. Coating. Provide Childers CP-38 or Foster 30-80 vapor barrier coating. Coating must meet MIL Spec C-19565C, Type II and be QPL Listed. Permeance shall be 0.013 perms or less at 43 mils dry. Tested at 100ºF and 90% RH per ASTM E96.

B. Outdoors: Provide as insulation coating Childers Encacel X or Foster Monolar 60-90. Permeance shall be 0.03 perms or less at 30 mils dry. Tested at 100ºF and 90% RH per ASTM F 1249.

C. Adhesive. Provide Childers CP-82 or Foster 85-20 vapor barrier adhesive.

D. Reinforcing Mesh. Provide 10 x 10 white glass or polyester reinforcing mesh.

2.3 OUTDOOR DUCT LAMINATED JACKETING

A. Rubberized bitumen compound material:
   1. Ultraviolet resistant
   2. Weatherproof
   3. Vapor retarding jacketing
   4. Laminated jacketing
   5. Cross-laminated high strength polyethylene film
   6. Laminated to aluminum foil
   7. Minimum 60-mil thickness

B. Acceptable Manufacturers:
   1. Alumaguard 60
   2. Flex Clad 400
   3. Venture Clad 1577CW

PART 3 - EXECUTION

3.1 FIRE SAFETY REQUIREMENTS

A. Do not extend duct coverings through walls or floors required to be fire-stopped or required to have a fire resistance rating. Interrupt duct coverings in the immediate vicinity of heat sources such as electric resistance or fuel-burning heater.

3.2 CONCEALED DUCT

A. Provide flexible glass fiber insulation with factory-applied, reinforced UL labeled Foil-Skrim-Kraft (FSK) facing.

B. Standing Seams. Insulate standing seams and stiffeners, which protrude through the insulation with 0.6 lb. per cubic foot density, 1-1/2" thick, faced, flexible blanket insulation. Insulation shall not prevent adjustment of damper operators.

C. Insulation shall be wrapped tightly on the ductwork with all circumferential joints butted and longitudinal joints overlapped a minimum of 2". In addition, secure insulation to the bottom of rectangular ductwork by the use of either weld pins with washers or cup-head pins welded to the ductwork or perforated based insulation hangers glued to the duct on twelve inch centers to prevent sagging of insulation.

D. On circumferential joint, the 2" flange on the facing shall be stapled with 9/16" outward clinch steel staples on 2" centers, and taped with a minimum 3" wide strip of glass fabric embedded in coating. Cover all seams, joints, pin penetrations and other breaks with vapor barrier coating reinforced with reinforcing mesh. Fabric shall not be visible after coating.

E. Ductwork in mechanical rooms is considered concealed spaces.

3.3 EXPOSED DUCT INSULATION

A. Ductwork in exposed locations is to be insulated with fiberglass rigid / semi-rigid board insulation.
   1. Apply fabric and mastic to provide a smooth surface for painting.

B. Standing Seams: Insulate standing seams and stiffeners which protrude through the insulation with 0.6 lb per cubic foot density, 1-1/2 inch thick, faced insulation. As a vapor seal, use reinforcing mesh with vapor barrier coating. Insulation shall not prevent adjustment of damper operators.

C. Insulation shall be wrapped tightly on the ductwork. Adhere insulation to ductwork with adhesive. In addition, secure insulation to the bottom of rectangular ductwork by the use of either weld pins with washers or cup-head pins welded to the ductwork or perforated based insulation hangers glued to the duct on 12 inch centers to prevent sagging of insulation.

D. Cover all seams, joints, pin penetrations and other breaks with coating reinforced with reinforcing mesh. Fabric shall not be visible after coating.

3.4 OUTDOOR DUCTWORK COVERING

A. Cover all supply and return ductwork outdoors:
   1. 1-1/2" thick, rigid closed cell insulation with reinforced foil facing.

B. Install a high point in center and slope in both directions so water will not stand on horizontal surfaces.

C. Impale the insulation over mechanical fasteners and washers.
   1. A minimum of 2 rows of fasteners per side on 12-inch centers.
   2. Seal all breaks, joints and punctures by applying a 1/8" thick vapor barrier mastic coating, embedded in open mesh reinforcing mesh.

D. Standing S, or flanged connections shall be covered with the same thickness of insulation overlapped a minimum of 4".

E. Apply a tack coat of Childers CP-10/11 or Foster 46-50 weather barrier mastic over the entire surface.
   1. While this coat is still tacky, Childers #5 glass fiber reinforcing mesh shall be smoothly applied and pressed into the mastic. The cloth shall be taut with adjacent edges overlapped a minimum of 4".
   2. After the first coat of mastic has taken its set, the second coat shall be applied over the cloth by palm, trowel, or spray to sufficient thickness that, when dried, the combined thickness of mastic and cloth is not less than 1/8".
   3. Upon completion, the openings in the cloth shall be completely sealed and the yarn shall not be visible. The completed work shall be completely smooth and present a plane surface.
   4. Aluminum gray or white finish as approved by the Architect.

F. Standing water on horizontal surfaces is not approved.

G. Apply outdoor duct laminated jacketing protection over entire insulation surface. Apply rubberized bitumen compound, applied to a cross-laminated high strength polyethylene film, laminated to aluminum foil.

3.5 GENERAL INSTALLATION

A. Install materials in accordance with manufacturer's instructions.

B. Apply insulation on clean, dry surfaces only.

C. Continue insulation with vapor barrier through penetrations.

D. Neatly finish insulation at supports, protrusions and interruptions.

E. Install insulation on clean, dry surfaces, and only after building is weatherproofed sufficiently to preclude any rainwater on insulation.

F. Apply mastic over the fiberglass reinforcing mesh to a thickness where fabric is not visible after completion.

G. Install fiberglass blanket duct insulation on top of supply air grilles not fire rated.

END OF SECTION 23 07 13

SECTION 23 31 13

DUCTWORK

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Duct construction, support and accessories. Dimensions shown on the drawings are free area dimensions.

1.2 RELATED WORK

A. Division 23 Mechanical
   1. Air Devices
   2. Insulation
   3. Testing, Balancing and Adjusting (TAB) of Environmental Systems

1.3 QUALITY ASSURANCE

A. The intent of ductwork specifications is to obtain superior quality workmanship resulting in an installation that is absolutely satisfactory in both function and appearance. Provide ductwork in accordance with the specifications for each type of service.

B. An approved contractor for this work under this division shall be:
   1. A specialist in this field and have the personnel, experience, training, skill, and the organization to provide a practical working system.
   2. Able to furnish evidence of having contracted for and installed not less than 5 systems of comparable size and type that have served their owners satisfactorily for not less than 5 years.

1.4 GUARANTEE

A. Guarantee ductwork for 1 year from the date of substantial completion. The guarantee covers workmanship, noise, chatter, whistling, or vibration. Ductwork shall be free from pulsation under conditions of operation.

1.5 CONTRACTOR COORDINATION

A. Erect ducts in the general locations shown, but conform to structural and finish conditions of the building. Before fabricating any ductwork, check the physical conditions at the job site and make necessary changes in cross sections, offsets, and similar items, whether they are specifically indicated or not.

B. Coordinate location of ductwork with structural members and Architectural drawings and requirements.

1.6 SHOP DRAWINGS AND SAMPLES

A. Submit shop drawings of all ductwork layouts, including enlarged plans and elevations of all air handling equipment, and summit details of duct fittings, including particulars such as gauge sizes, welds, and configurations prior to starting work.

B. Submit product data and sealing materials to be used.

C. Submit sound attenuation data.

D. Submit shop drawings in plan, elevation and sections, and three-dimensional view showing equipment in mechanical equipment areas.

PART 2 - PRODUCTS

2.1 STANDARDS AND CODES

A. Except as otherwise indicated, sheet metal ductwork material and installation shall comply with the latest edition of SMACNA HVAC Duct Construction Standards. Air distribution devices (such as dampers) included in this specification shall comply with the latest applicable SMACNA Fire, Smoke and Radiation Damper Installation Guide for HVAC Systems and NFPA 90A.

2.2 DUCT MATERIAL AND CONSTRUCTION

A. Except for the special ducts specified below use lock forming quality prime galvanized steel sheets or coils up to 60" wide. Stencil each sheet with gauge and manufacturer's name. Stencil coils of sheet steel throughout on 10' centers with gauge and manufacturer's name. Provide certification of duct gauge and manufacturer for each size duct.

B. Rectangular low and medium pressure duct constructed of sheet metal in accordance with the latest edition of SMACNA HVAC Duct Construction Standards.

C. Medium pressure oval and round ductwork shall be spiral seam. Spiral lock-seam SMACNA Type RL-1. Fittings shall be welded construction.
   1. Galvanized

D. Low pressure round ducts shall be shop fabricated with snap lock longitudinal seams. Ducts shall be constructed for a minimum of 2" w.g. static pressure.

2.3 ACOUSTICAL DUCT

A. Duct and fittings:
   1. Double wall acoustically treated.
   2. Annular space packed with fiberglass insulation.
   3. Perforated metal liner to provide specific acoustic impedance
   4. Insulation 1.0 pcf. 1 inch thick
   5. United McGill Acousti-K27 spiral lockseam or approved equal
   6. Material as indicated below:
      a. Paintable Galvanized Steel

B. Pressure rating and tests as specified for single wall ductwork.

2.4 DUCT SEALING OF SEAMS AND JOINTS

A. Follow seal classification as indicated in Table 1-2 of SMACNA "HVAC AIR DUCT LEAKAGE TEST MANUAL". Use seal class A for 4" w.g. static. All longitudinal and transverse joints and seams shall be sealed by use of a fireproof, non-hardening, and non-migrating elastomeric sealant. With the exception of continuously welded joints and machine made spiral lock seams, joints and seams made air tight with duct sealer.
   1. Indoor applications – Foster 32-14
   2. Outdoor applications – Foster 32-17

2.5 FLEXIBLE DUCT LOW PRESSURE

A. Construction:
   1. Continuous galvanized spring steel wire helix, with reinforced metalized cover
      a. The fabric shall be mechanically fastened to the steel helix without the use of adhesives.
   2. UL 181 Class I air duct label
   3. Reinforced vapor barrier jacket
   4. Rated for use at system pressure (6" wc minimum)
   5. Flexible duct connections from lateral taps to variable volume boxes or terminal boxes shall be rated at twice the maximum pressure rating of the medium pressure system.

B. Fire hazard classification:
   1. Flame spread rating 25 maximum.
   2. Smoke developed rating 50 maximum.

C. Thermal characteristics:
   1. R-6 BTU/hr/sq. ft./°F (when located in a conditioned plenum)
   2. R-8 BTU/HR/Sq.Ft./°F (when located in an unconditioned plenum)
   3. 2" minimum wall thickness insulation with 1" overlap

D. Acceptable manufacturers:
   1. Flexmaster
   2. Hart & Cooley
   3. Omniair
   4. Peppertree Air Solutions

2.6 FLEXIBLE DUCT MEDIUM/HIGH PRESSURE

A. The duct shall be constructed of a heavy coated fiberglass cloth fabric supported by helical wound galvanized steel. The fabric shall be mechanically fastened to the steel helix without the use of adhesives.

B. The internal working pressure rating shall be at least as follows with a bursting pressure of at least two times the working pressure:
   Positive: 12" w.g.
   Negative: 5" w.g.

C. The duct shall be rated for a velocity of at least 5500 fpm.

D. Suitable for operating temperature range of -20°F to +250°F.

E. Factory insulate the flexible duct with fiberglass insulation.
   1. R-6 BTU/hr/sq. ft./°F (when located in a conditioned plenum)
   2. R-8 BTU/HR/Sq.Ft./°F (when located in an unconditioned plenum)
   3. 2" minimum wall thickness insulation with 1" overlap

F. Cover the insulation with a fire retarding polyethylene vapor barrier jacket having a permeance of not greater than 0.10 perms when tested in accordance with ASTM E96, Procedure A.

G. Acceptable manufacturers:
   1. Flexmaster
   2. Omniair
   3. Peppertree Air Solutions

2.7 FIRE DAMPERS

A. Fire dampers for required wall ratings that are 95% minimum free area. Provide Type B or Type C UL dampers for low, medium and high-pressure rectangular, square or round ducts. Dampers shall be activated by a fusible link designed to react at 165°F. Install per manufactures recommendations to provide a UL assembly. Provide sealed sleeve to meet desired leakage performance.

B. Acceptable Manufacturers:
   1. Ruskin
   2. Prefco Products
   3. Air Balance
   4. Greenheck, Inc.
   5. Nailor Industries
   6. Pottoroff

2.8 CEILING RADIATION DAMPERS

A. Ceiling Radiation Dampers at location shown on plans constructed and tested in accordance with the current edition of UL555C of a minimum 22 gauge (0.8) blades, hinged in the center and held open with a 165° fusible link. Maximum blade height in the open position shall be 10" overall regardless of damper area. Maximum distance between blades held in the open position shall be 1-1/4" for units not requiring blade insulation and 1/4" for units with sheetrock blade insulation. Blades requiring radiation protection insulation shall utilize sheetrock. Refractory Ceramic or Mineral Wool Fiber is not allowed in the air stream. Radiation insulation outside of the air stream shall be Mineral Wool Fiber only. Ceramic Fiber Material is not approved for use. Units shall be constructed of a minimum 20-gauge (0.9) frame welded at all seams.

B. Acceptable Manufactures
   1. Ruskin
   2. Prefco
   3. Air Balance
   4. Phillips
   5. Safe-Air
   6. Nailor Industries

2.9 WALL LOUVERS

A. Refer to schedule on drawings. Coordinate with Architectural Drawings.

B. All louver frames shall be a minimum of 0.08" extruded aluminum. All blades shall be a minimum of 0.081" extruded aluminum. Beginning point of water penetration at 0.01 oz/sq.ft. Shall be a minimum of 800 ft/min.

C. Provide all louvers with removable aluminum bird screen with 1/4" mesh.

D. Acceptable manufacturers:
   1. American Warming and Ventilation
   2. Arrow
   3. Greenheck
   4. NCA
   5. Pottorff
   6. Ruskin

2.10 DUCT LINING

A. Duct lining shall be 1" thick, 1-1/2 lb. density, flexible lining coated on the air stream side to reduce attrition. Liner shall be Schuler Lina-Coustic, Certain-Teed Ultralite, or equal meeting requirements of NFPA 90-A. Provide I.A.Q. rated liner.

2.11 CONTROL DAMPERS

A. Opposed blade dampers for 2-position and modulating control. Construct frames of 13-gauge galvanized sheet metal with provisions for duct mounting. Damper blades not exceeding 8" in width, of corrugated-type construction, fabricated from two sheets of 22-gauge galvanized sheet metal spot-welded together or a single 16-gauge sheet. Make bearings of nylon or oil-impregnated, sinthered bronze. Make shafts of 1/2" zinc-plated steel. Blades suitable for high velocity performance. Construct damper so that leakage does not exceed 1/2% based on 2000 fpm and 4" static pressure. Provide replaceable resilient seals along top, bottom and sides of frame and along blade edge. Submit leakage and flow characteristics data with shop drawings. Linkage shall be concealed out of the air stream within damper frame to reduce pressure drop and noise.

B. Acceptable Model is Ruskin Model CD60.

2.12 VOLUME DAMPERS

A. Manual balancing dampers that meet or exceed the following minimum construction standards:
   1. Frame 16-gauge
   2. Blades 16-gauge
   3. Bearings corrosion resistant
   4. Concealed linkage
   5. Opposed blade dampers

B. Acceptable manufacturer:
   1. Ruskin Model MD-35 or approved equal, by
   2. Arrow
   3. American Warming and Ventilating
   4. Nailor Industries
   5. Pottoroff

2.13 ACCESS DOORS

A. Round spin-in door of galvanized steel.
   1. Fire proof sealing gaskets and quick fastening locking devices
   2. Insulated door
   3. Conform to the requirements of the NFPA
   4. Identification and use of each access door
   5. UL label to match the construction in which it is installed
   6. Cable attached to door and outer frame
   7. Low leakage Access Door

B. Acceptable Manufacturer
   1. Flex master, Inspector Series
   2. Approved Equal

2.14 COMBINATION FIRE/SMOKE DAMPERS

A. Combination fire/smoke dampers meeting the following requirements:
   1. Each combination fire/smoke damper shall be 1-1/2 hour fire rated under UL Standard 555, 4th Edition, and shall be further classified by Underwriters Laboratories as a leakage Rated Damper for use in smoke control systems under the latest version of UL555S, and bear a UL label attesting to same. The damper manufacturer shall have tested, and qualified with UL, a complete range of damper sizes covering all dampers required by this specification. Testing and qualifying a single damper size is not acceptable. The leakage rating under UL555S shall be Leakage Class II.
   2. The damper frame shall be a minimum of 16 gauge, galvanized steel, formed into a structural hat channel shape with tabbed corners for reinforcement, as approved in testing by Underwriters Laboratories. Bearings shall be integral high surface area non-electrolytic materials construction to incorporate a friction free frame blade lap seal, or molybdenum disulfide impregnated stainless steel or bronze oilite sleeve type turning in the damper frame. The dampers shall be opposed blade type. The blades shall be constructed with a minimum of 16-gauge galvanized steel. The blade edge seal material shall be able to withstand 450°F. The jamb seals shall be flexible stainless steel compression type.
   3. As part of the UL qualification, dampers shall have demonstrated a capacity to operate (open and close) under HVAC system operation conditions, with pressures of at least 4" water gauge in the closed position, and 2,000 fpm air velocity in the open position.
   4. Each combination fire/smoke damper shall be equipped with a controlled 7 to 15 second heat-actuated release device. The electric EFL shall close and lock the fire/smoke damper during test, smoke detection, power failure or fire conditions through actuator closure springs. To prevent duct and HVAC component damage, the damper shall at all times be connected to the actuator for controlled closure in not less than 7 seconds and no more than 15 seconds. Instantaneous damper closure is unacceptable. After exposure to high temperature of fire, the damper must be inspected prior to reset to ensure proper operation. Release temperature is 165°F.

5. Provide UL555S qualified electric actuator at 120 VAC.
6. Provide air-foil type blades.

B. Provide integral sleeves

C. Acceptable Manufacturers:
1. Ruskin
2. Air Balance, Inc.
3. Greenheck, Inc.
4. Nailor Industries
5. Pottoroff

2.15 SMOKE DAMPERS

A. Smoke dampers meeting the following requirements.
1. Each smoke damper shall be classified by Underwriters Laboratories as a leakage Rated Damper for use in smoke control systems under the latest version of UL555S, and bear a UL label attesting to same. The damper manufacturer shall have tested, and qualified with UL, a complete range of damper sizes covering all dampers required by this specification. Testing and qualifying a single damper size is not acceptable. The leakage rating under UL555S shall be Leakage Class II.
2. The damper frame shall be a minimum of 16 gauge, galvanized steel, formed into a structural hat channel shape with tabbed corners for reinforcement, as approved in testing by Underwriters Laboratories. Bearings shall be integral high surface area non-electrolytic materials construction to incorporate a friction free frame blade lap seal, or molybdenum disulfide impregnated stainless steel or bronze oilite sleeve type turning in the damper frame. The dampers shall be opposed blade type. The blades shall be constructed with a minimum of 16 gauge, galvanized steel. The blade edge seal material shall be able to withstand 450°F. The jamb seals shall be flexible stainless steel compression type.
3. As part of the UL qualification, dampers shall have demonstrated a capacity to operate (open and close) under HVAC system operation conditions, with pressures of at least 4" water gauge in the closed position, and 2,000 fpm air velocity in the open position.
4. Provide UL555S qualified electric actuator at 120 VAC.
5. Provide air-foil type blades.

B. Provide integral sleeves.

C. Acceptable Manufacturers:
1. Ruskin
2. Air Balance, Inc.
3. Greenheck, Inc.
4. Nailor Industries
5. Pottoroff

2.16 DIFFUSER FITTINGS LOW PRESSURE TAPS

A. Fitting shall meet or exceed the following minimum construction standards:
1. Conical with a base diameter two inches larger than the tap diameter.
2. Construct fitting and damper of galvanized steel in accordance with ASTM A 527, G90 finish.
   a. Fitting with a 3/16-inch high stop bead approximately 2-1/2-inches from the discharge end of the fitting
   b. Provide the fitting with a butterfly damper, damper rod, end bearings and heavy duty locking quadrant.
   c. Size the length of the straight section of the fitting to match the damper blade diameter. Center the damper blade in the straight section.

3. Match the fitting body gauge to the SMACNA duct gauge, but not less than:
   a. Through 8 inches: 26 gauge; Damper blade 22 gauge
   b. 10 inches and 12 inches: 24 gauge; Damper blade 22 gauge
   c. 14 inches and 16 inches: 22 gauge; Damper blade 22 gauge
   d. 18 inches and 20 inches: 20 gauge; Damper blade 20 gauge
4. Fasten damper blade to a 3/8 X 3/8 continuous square rod with minimum (2) galvanized U-bolts.
5. Support the damper rod to the fitting with airtight nylon end bushings / bearings.
6. Provide the damper with a self-locking regulator and handle.
7. Provide a 2" sheet metal stand-off to extend the regulator.
8. Flex duct grip area – 2 inches behind retaining bead
9. Flex duct retaining bead – 1 inch from end
10. Conical length of at least 3 inches
11. Barrel length of at least 9 inches

2.17 AUXILIARY DRAIN PANS

A. Galvanized steel, same gauge and same bracing or cross breaks as a duct with same dimensions. Sides of pan turned up to 1-1/2", all joints soldered watertight. Pan is to be large enough to complete cover drip lines of unit.

2.18 DUCTWORK SUPPORTS ON ROOF

A. Support ductwork on roof with Portable Pipe Hanger Model PHP-D fully adjustable height and width. Base material shall be high density / high impact polypropylene with UV inhibitors and anti-oxidants. Provide with hot dip galvanized framing. Nuts and washers shall be hot dip galvanized.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Use construction methods and requirements as outlined in SMACNA HVAC Duct Construction Standards as well as SMACNA Balancing and Adjusting publications, unless indicated otherwise in the specifications. Refer to details on the drawings for additional information.

B. Reinforce ducts in accordance with recommended construction practice of SMACNA. Provide additional reinforcement of large plenums as required to prevent excessive flexing and or vibration.

C. Cross break or bead sheet metal for rigidity, except ducts that are 12" or less in the longest dimension.

D. Where ducts pass through walls in exposed areas, install suitable escutcheons made of sheet metal angles as closers.

E. At locations where ductwork passes through floors, provide watertight concrete curb around penetration.

F. Support ducts where passing through floors with galvanized steel structural angles of adequate bearing surface.

G. Metal or lined ductwork exposed to view through grilles, registers, and other openings shall be painted flat black. Do not install grilles, registers, or similar items until painting is complete.

H. Fire Dampers shall be installed per manufacturer's recommendations to create a UL rated assembly.

I. Install end bearing at all location where damper shaft penetrates duct wall.

J. Clean duct to remove accumulated dust. Ducts shall be closed on ends between phases of fabrication to assure that no foreign material enters the ducts.

3.2 DUCTWORK

A. Construct rectangular ducts and round ducts in accordance with the latest SMACNA HVAC Duct Construction Standards. Use the static pressure specified on the air handling unit schedule or fan schedules as a minimum for duct construction. All ductwork between the variable volume air handling units and the terminal units shall be constructed to the medium pressure ductwork specification.

B. Provide adjustable, galvanized splitter-dampers, pivoted at the downstream end with appropriate control device at each supply duct split.

C. For branch ducts wider than 18", and when shown on drawings provide extractors with an appropriate control device at each rectangular zone or branch supply duct connection. Provide controllers for extractors. Branch ducts shall have a 45° angle in the direction of flow. Do not provide extractor at branch ducts to sidewall registers where the registers are within 10 feet of the main duct.

D. Shop manufactured curved blade scoops may be used for branch duct takeoffs up to 18" wide. Taper scoop blade to the end, to prevent any sagging that may cut into, or damage duct liner if specified during operation.
   1. Construct shop manufactured scoops and splitter blades of galvanized sheet metal 2 full gauges heavier than equivalent sheet metal gauge of branch duct (up to 16 gauge).
   2. Check extractors, scoops and splitter blades thoroughly for freedom of operation. Oil bearing points before installing.

E. Use pushrod operator with locking nut and butt hinges assembly.

F. Provide opposed-blade volume dampers with an appropriate control device in each of the following locations:
   1. Return air ductwork
   2. Outside air branch duct
   3. Exhaust branch duct
   4. Exhaust connections to hoods except kitchen grease hoods or equipment
   5. In each zone at multi-zone unit discharge installed downstream of duct mounted re-heat coils
   6. At each outside air and return air duct connection to plenum of constant volume units
   7. At discharge side of constant volume boxes
   8. Where otherwise indicated or required for balancing coordinate location of additional dampers required by TAB Contractor.
   9. Provide multi-blade dampers when blade width exceeds 12". Provide end bearing where damper shaft penetrates duct wall.

G. Elbows:
   1. Rectangular: Where square elbows are shown, or are required for good airflow, provide and install single-wall or airfoil turning vanes. Job-fabricated turning vanes, if used, shall be single-thickness vanes of galvanized steel sheets of the same gauge metal as the duct in which they are installed. Furnish vanes fabricated for the same angle as the duct offset. The use of radius elbows with a centerline radius of not less than 1-1/2 times the duct width may be provided in lieu of vaned elbows where space and air flow requirements permit.
   2. Round Oval Duct. Provide elbows with a centerline radius of 1-1/2 times the duct diameter or duct width. For round ducts, furnish smooth elbows or 5 piece, 90° elbows and 3 piece, 45° elbows.

H. For control devices concealed by ceilings, furring, or in other inaccessible locations, furnish extension rods and appropriate recessed-type Young regulators, mounted on the surface of the ceiling or the furring, unless specified, or shown otherwise. Provide with chrome plated cover plates. Use only one mitered gear set for each control device.

I. Install streamline deflectors at any point where dividing a sheet metal duct around piping or where other such obstruction is permitted. Where such obstructions occur in insulated ducts, fill space inside streamliner and around obstructions with glass fiber insulation.

J. Insulated Flexible Duct:
   1. Install in accordance with manufacturer's instructions, and the terms of its UL listing. Duct shall not exceed 6' in length. Make connections by use of sheet metal collars and stainless steel circular screw clamps. Clamps shall encircle the duct completely and be tightened with a worm gear operator to the point that will provide an airtight connection without unnecessary deformation of the duct. Provide one clamp on flexible duct and one clamp on external insulation. Vapor barrier jacket shall be tucked inside to conceal insulation material.
   2. Construct bends over 45° with sheet metal elbows.

K. Duct Supports:
   1. Horizontal ducts up to 40". Support horizontal ducts up to and including 40" in their greater dimension by means of #18 U.S. gauge galvanized iron strap hangers attached to the ducts by a minimum of two locations per side by means of screws, rivets or clamps, and fastened to inserts with toggle bolts, beam clamps or other approved means. Place supports on at least 8' centers. Use clamps to fasten hangers to reinforcing on sealed ducts.
   2. Horizontal ducts larger than 40". Support horizontal ducts larger than 40" in their greatest dimension by means of hanger rods bolted to angle iron trapeze hangers. Place supports on at least 8' centers in accordance with SMACNA Standards.
   3. Support vertical ducts where they pass through the floor lines with 1-1/2" x 1-1/2" x 1/4" angles for ducts up to 60". Above 60", the angles shall be increased in strength and sized on an individual basis considering space requirements.
   4. Supports shall be suspended from structural or by independent support. Do not support from structural bridging. Upper attachments should be selected with a safety factor of 4 or 5 times actual load conditions and subject to Engineers approval. Double wrap straps over open web of joist.

L. Branch connections for medium pressure ductwork shall be made with a conical lateral. Field installed conical branch ducts shall be minimum 20-gauge galvanized sheet metal, “Everdur” welded and coated with “Galvabar”.

3.3 PLENUMS

A. Return air plenums shall be rectangular galvanized sheet metal ductwork.

B. Fabricate plenums upstream of fan of 16-gauge material.

C. Fabricate plenums upstream of filters minimum 18-gauge material.

3.4 FLEXIBLE CONNECTIONS

A. Where ducts connect to fans or air handling units that are not internally isolated, make flexible airtight connections using "Ventglas" fabric. The fabric shall be fire-resistant, waterproof and mildew resistant with a weight of approximately 30 ounces per square yard. Provide a minimum of 1/2" slack in the connections, and a minimum of 2-1/2" distance between the edges of the ducts. Also, provide a minimum of 1" slack for each inch of static pressure on the fan system. Fasten fabric to apparatus and to adjacent ductwork by means of galvanized flats or draw bands. Where connections are made in outdoor locations, seal fabric to metal with mastic.

3.5 ACCESS DOORS

A. Install ductwork access doors as noted below, arranged for convenient access. Stencil each door for specific use. Install access doors in each of the following locations:
   1. Fire Dampers
   2. Smoke Dampers
   3. Smoke/fire Dampers
   4. Outside Air Dampers
   5. Duct Mounted Coils (up-stream)
   6. Control Dampers

B. Size access door 1" smaller than ductwork.
   1. Available Sizes: 8”, 10”, 12”, 18”, 24”

C. Construct access door air tight, and conform to recommendations of NFPA and SMACNA.

D. Demonstrate suitability of access for the intended purpose. Install multiple access doors as required.

3.6 DUCT LINING

A. Install glass fiber acoustical lining where shown on drawings. Secure to duct surfaces with Foster 85-62 / 85-60 or Childers CP-125-1 / CP-127 adhesive and sheet metal fasteners on 12" centers. Coat exposed edges and leading edges of cross-joints with adhesive.

B. Provide metal nosing that is either channeled or "Z" profiled or are integrally-formed from the duct wall securely installed over transversely oriented liner edges facing the air stream at fan discharge and at any interval of lined duct preceded by unlined duct.

C. Refer to Insulation & Liner Detail on drawings for locations requiring liner to be installed.

D. Do not install liner in multi-zone unit ductwork.

3.7 SEALING OF SEAMS AND JOINTS

A. Seal supply, return, exhaust and outside air duct systems.

3.8 ACOUSTICAL DUCT

A. Install in the following locations:
   1. where indicated on the drawings

3.9 CONNECTIONS TO LOUVERS

A. Make watertight connections to all louvers. Ductwork behind louver shall have watertight soldered joints for a minimum of three feet and be sloped to bottom of louver. Lap duct to be over bottom louver blade where possible.

B. Where plenums are installed on inside of louver, construct such that bottom of plenum will lap over bottom blade of louver to drain any water that may enter.

3.10 PLENUMS

A. Construct plenums with galvanized steel framing members and galvanized sheet steel, cross broken and rigidly braced with galvanized angles. Gauges and bracing shall conform to SMACNA recommendations for ductwork of like sizes. Openings for fans, access doors, etc., shall be framed with galvanized steel angles.

B. Provide access doors.

3.11 AUXILIARY DRAIN PANS

A. Where coils that have a condensate drain are located above ceiling.

3.12 TESTING OF LOW PRESSURE DUCTWORK

A. Test ductwork for leaks before concealing. Maximum allowable leakage is 5% of total airflow.

B. Provide equipment necessary for performing tests, including rotary blower large enough to provide

required static pressure at allowed CFM quantity, certified orifice section with proper papers, traceable serial numbers and pressure vs CFM leakage rate scale, U-tube gauge board complete with cocks, tubing, and inclined manometer for leakage rates.

C. Mains: Test mains after risers and branches are tied in and all equipment set. Close runout connections and place fan in operation. Provide pressure in mains at 1-1/2 times design pressure. Visually inspect joints. Repair leaks detected by sound or touch. Release mains for completion after joints are tight.

D. Ductwork down stream of terminal boxes, return, exhaust, and outside air ducts are to be visually inspected.

3.13 TESTING OF MEDIUM AND HIGH PRESSURE DUCT

A. As the project progresses, test the ductwork in sections.

B. Provide equipment necessary for performing tests, including rotary blower large enough to provide required static pressure at allowed CFM quantity, certified orifice section with proper papers, traceable serial numbers, and pressure vs. CFM leakage rate scale, U-tube gauge board complete with cocks, tubing, and inclined manometer for leakage rates.

C. Finally as a complete system, test ductwork at a minimum of 2.5" with a maximum allowable leakage of 1% of the total design supply airflow.

D. Test method as set forth in SMACNA "HVAC Duct Construction Standards".

END OF SECTION 23 31 13

SECTION 23 37 13

AIR DEVICES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Furnish and install air distribution devices, including grilles, diffusers, registers, dampers, and extractors.

1.2 RELATED WORK

A. Division 23 Mechanical.
   1. Ductwork.
   2. Air Balance.
   3. Electrical Requirements for Mechanical Work.

1.3 COOPERATION WITH OTHER TRADES

A. Coordinate this work with work under Division 26 Electrical, to ensure that intended functions of lighting and air systems are achieved.

1.4 SUBMITTALS

A. Submit product data for outlets, grilles, registers, control devices, and similar equipment for review prior to placement of purchase order.

B. Submittal shall include performance sheet for each air device type. Performance sheet shall include NC levels, throw, and total pressure loss at various air flows.

1.5 FINISHES

A. Paint exposed devices with factory standard prime coat, or factory finish coat, as specified.

PART 2 - PRODUCTS

2.1 DIFFUSERS, GRILLES AND REGISTERS - Refer to Drawing Schedule.

2.2 ACCEPTABLE MANUFACTURERS

A. Titus.

B. Krueger.

C. Nailor Industries.

D. Price

E. Metal-Aire

2.3 ACCESSORIES

A. Supply Grille Extractors. Provide supply grilles with an air control device capable of positively regulating the volume of air extracted from the supply duct. Select extractors similar to Titus Model AG25, tight-closing in the minimum position. Include a key-operated or worm-gear adjusting mechanism to facilitate positioning from the grille opening. Where adjustment is not accessible at the grille opening, provide a square control rod equipped with a locking quadrant.

B. Mounting Frames. Provide each grille or register not equipped with a removable core with a companion, all-purpose mounting frame constructed like grille frame to facilitate installation and removal of the grille or register without marring adjacent mounting surfaces.
   1. Furnish frames with 1/2" thick sponge rubber gasket to prevent air leakage.
   2. Provide a frame that neatly fits the grille. Mounting frames will not be required for grilles or registers mounted directly on exposed ductwork.

PART 3 - EXECUTION

3.1 INSPECTION

A. Do not install ceilings adjacent to fixtures until installation of fixtures, air supply assemblies, return-air blank-off strips and flexible duct have been approved. Remove and reinstall any part of the installation found incorrect.

3.2 INSTALLATION

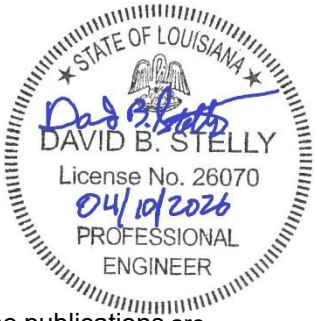
A. Louvered diffuser outlets mount tight against the ceiling. Fasten outlets to ductwork with sheet metal screws. For perforated diffusers, attach the frame assembly by a concealed hinge assembly to an outer frame compatible with the type of ceiling on which the diffuser is installed.

END OF SECTION 23 37 13

DIVISION 26
ELECTRICAL

26 00 00	BASIC MATERIALS AND METHODS
26 20 10	INTERNAL DISTRIBUTION SYSTEM
26 51 00	LIGHTING FIXTURES

SECTION 26 00 00 - BASIC ELECTRICAL MATERIALS AND METHODS



PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 709 (2017) Laminated Thermosetting Material

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910.147 Control of Hazardous Energy (Lock Out/Tag Out)

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC. (IEEE)

IEEE C2 (2023) National Electrical Safety Code

IEEE C57.12.28 (2014) Standard for Pad-Mounted Equipment - Enclosure Integrity

IEEE 100 (2000; Archived) The Authoritative Dictionary of IEEE Standard Terms

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA 250 (2020) Enclosures for Electrical Equipment (1000 Volts Maximum)

NEMA ICS 6 (1993; R2016) Industrial Control and Systems: Enclosures

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (2020) National Electrical Code

1.2 RELATED REQUIREMENTS

This section applies to all sections of Division 26, "Electrical," and Division 28, “Safety & Security,” of this project specification unless specified otherwise in the individual sections.

1.3 DEFINITIONS

A. Unless otherwise specified or indicated, electrical and electronics terms used in these specifications, and on the drawings, shall be as defined in IEEE 100.
B. The technical sections referred to herein are those specification sections that describe products, installation procedures, and equipment operations and that refer to this section for detailed description of submittal types.
C. The technical paragraphs referred to herein are those paragraphs in PART 2 - PRODUCTS and PART 3 - EXECUTION of the technical sections that describe products, systems, installation procedures, equipment, and test methods.

1.4 ELECTRICAL CHARACTERISTICS

Electrical characteristics for this project shall be 120/240 volts, three phase, four wire, 60 Hz, 120/208 volts, three phase, four wire, 60 Hz and 277/480 volts, three phase, four wire, 60 Hz. Final connections to the power distribution system at the existing distribution panel shall be made by the Contractor as directed by the Design Professional.

1.5 SUBMITTALS

Submittals required in the sections which refer to this section shall conform to the requirements of the Submittals Section and to the following additional requirements. Submittals shall include the manufacturer's name, trade name, place of manufacture, catalog model or number, nameplate data, size, layout dimensions, capacity, project specification and technical paragraph reference. Submittals shall also include applicable federal, military, industry, and technical society publication references, and years of satisfactory service, and other information necessary to establish contract compliance of each item to be provided. Photographs of existing installations are unacceptable and will be returned without approval.

A. Manufacturer's Catalog Data: Submittals for each manufactured item shall be current manufacturer's descriptive literature of cataloged products, equipment drawings, diagrams, performance and characteristic curves, and catalog cuts. Handwritten and typed modifications and other notations not part of the manufacturer's preprinted data will result in the rejection of the submittal. Should manufacturer's data require supplemental information for clarification, the supplemental information shall be submitted as specified for certificates of compliance.

B. Drawings: Include wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure a coordinated installation. Wiring diagrams shall identify circuit terminals and indicate the internal wiring for each item of equipment and the interconnection between each item of equipment. Drawings shall indicate adequate clearance for operation, maintenance, and replacement of operating equipment devices.

C. Instructions: Where installation procedures or part of the installation procedures are required to be in accordance with manufacturer's instructions, submit printed copies of those instructions prior to installation. Installation of the item shall not proceed until manufacturer's instructions are received. Failure to submit manufacturer's instructions shall be cause for rejection of the equipment or material.

D. Certificates: Submit manufacturer's certifications as required for products, materials, finishes, and equipment as specified in the technical sections. Certificates from material suppliers are not acceptable. Preprinted certifications and copies of previously submitted documents will not be acceptable. The manufacturer's certifications shall name the appropriate products, equipment, or materials and the publication specified as controlling the quality of that item. Certification shall not contain statements to imply that the item does not meet requirements specified, such as "as good as"; "achieve the same end use and results as materials formulated in accordance with the referenced publications"; or "equal or exceed the service and performance of the specified material." Certifications shall simply state that the item conforms to the requirements specified.

   Certificates shall be printed on the manufacturer's letterhead and shall be signed by the manufacturer's official authorized to sign certificates of compliance.

   1. Reference Standard Compliance: Where equipment or materials are specified to conform to industry and technical society reference standards of the organizations such as American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), National Electrical Manufacturers Association (NEMA), Underwriters Laboratories Inc. (UL), and Association of Edison Illuminating Companies (AEIC), submit proof of such compliance.

The label or listing by the specified organization will be acceptable evidence of compliance.

2. Independent Testing Organization Certificate: In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and approved by the Design Professional. The certificate shall state that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

E. Material and Equipment Manufacturing Date: Products manufactured more than three years prior to date of delivery to site shall not be used, unless specified otherwise.

1.6 QUALITY ASSURANCE

A. Material and Equipment Qualifications: Provide materials and equipment that are products of manufacturers regularly engaged in the production of such products which are of equal material, design and workmanship. Products shall have been in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year period shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been on sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2-year period. Where two or more items of the same class of equipment are required, these items shall be products of a single manufacturer; however, the component parts of the item need not be the products of the same manufacturer unless stated in the technical section.

B. Regulatory Requirements: Equipment, materials, installation, and workmanship shall be in accordance with the mandatory and advisory provisions of NFPA 70.

C. Alternative Qualifications: Products having less than a 2-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturers' factory or laboratory tests, is furnished.

D. Service Support: The equipment items shall be supported by service organizations which are reasonably convenient to the equipment installation in order to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.

E. Manufacturer's Nameplate: Each item of equipment shall have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.

F. Modification of References: In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" had been substituted for "should" wherever it appears. Interpret references in these publications to the "authority having jurisdiction," or words of similar meaning, to mean the Design Professional.

1.7 NAMEPLATES

ASTM D 709. Provide laminated plastic nameplates for each panelboard; as specified in the technical sections or as indicated on the drawings. Each nameplate inscription shall identify the function and, when applicable, the position. Nameplates shall be melamine plastic, 0.125 inch thick, white with black center core. Surface shall be matte finish. Corners shall be square. Accurately align lettering and engrave into the core. Minimum size of nameplates shall be one by 2.5 inches. Lettering shall be a minimum of 0.25 inch high normal block style.

1.8 ELECTRICAL REQUIREMENTS

Electrical installations shall conform to IEEE C2, NFPA 70, and requirements specified herein.

1.9 MECHANICAL REQUIREMENTS

All control equipment to provide the proper sequence of operation shall be furnished and installed by the electrical contractor.

All conduit and wiring for control purposes shall be furnished and installed as work of this electrical section. All control wiring shall be color coded.

1.10 LOCKOUT REQUIREMENTS

Provide disconnecting means capable of being locked out for machines and other equipment to prevent unexpected startup or release of stored energy in accordance with 29 CFR 1910.147. Mechanical isolation of machines and other equipment shall be in accordance with requirements of Division 23, "Mechanical."

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

3.1 PAINTING OF EQUIPMENT

A. Factory Applied: Electrical equipment shall have factory-applied painting systems which shall, as a minimum, meet the requirements of NEMA ICS 6 corrosion-resistance test.

B. Field Applied: Paint electrical equipment as required to match finish of adjacent surfaces or to meet the indicated or specified safety criteria.

3.2 NAMEPLATE MOUNTING

Provide number, location, and letter designation of nameplates as indicated. Fasten nameplates to the device with a minimum of two sheet-metal screws or two rivets, or industrial adhesive.

END OF SECTION 26 00 00

ECTION 26 20 00 - INTERIOR DISTRIBUTION SYSTEM

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI C80.1	(2020) Electrical Rigid Steel Conduit (ERSC)
ANSI C80.3	(2020) Steel Electrical Metallic Tubing (EMT)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM B1	(2018) Hard-Drawn Copper Wire
ASTM B8	(2011; R2017) Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
ASTM D709	(2017) Laminated Thermosetting Materials

INTERNATIONAL ELECTRICAL TESTING ASSOCIATION (NETA)

ANSI/NETA ATS	(2021) Acceptance Testing Specifications

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA 250	(2021) Enclosures for Electrical Equipment (1000 Volts Maximum)
NEMA ICS 1	(2022) Industrial Control and Systems; General Requirements
NEMA ICS 6	(1993; R2016) Industrial Control and Systems: Enclosures
NEMA KS 1	(2013) Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum)
NEMA ST 20	(2021) Dry-Type Transformers for General Applications
NEMA TC 2	(2020) Electrical Polyvinyl Chloride (PVC) Tubing and Conduit
NEMA TC 3	(2021) Polyvinyl Chloride PVC Fittings for Use with Rigid PVC Conduit and Tubing
NEMA TC 14	(2015) Reinforced Thermosetting Resin Conduit (RTRC) and Fittings
NEMA WD 1	(1999; R2020) General Color Requirements for Wiring Devices
NEMA WD 6	(2021) Wiring Devices - Dimensional Requirements
NEMA Z535.4	(2011; R2017) Product Safety Signs and Labels

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2020) National Electrical Code
NFPA 70E	(2021) Electrical Safety in the Workplace

UNDERWRITERS LABORATORIES INC. (UL)

UL 1	(2005; Reprint Jan 2020) Flexible Metal Conduit
UL 5	(15th Edition - May 2016) UL Standard for Safety Surface Metal Raceways and Fittings
UL 6	(2007; Reprint Sep 2019) Electrical Rigid Metal Conduit - Steel
UL 20	(2018; Reprint Jan 2021) General-Use Snap Switches
UL 50	(2015) Enclosures for Electrical Equipment
UL 67	(2018; Reprint Jul 2020) Panelboards
UL 83	(2017; Reprint Mar 2020) Thermoplastic-Insulated Wires and Cables
UL 360	(2013; Reprint Aug 2021) Liquid-Tight Flexible Steel Conduit
UL 467	(11th Edition - Apr 2022) Grounding and Bonding Equipment
UL 486A-486B	(2018; Reprint May 2021) Wire Connectors
UL 486C	(2018; Reprint May 2021) Splicing Wire Connectors
UL 489	(2016; Rev 2019) Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures
UL 506	(2017; Reprint Jan 2022) Specialty Transformers
UL 508	(2018; Reprint Jul 2021) Industrial Control Equipment
UL 510	(2020) Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape
UL 514A	(2013; Reprint Aug 2017) Metallic Outlet Boxes
UL 514B	(2012; Reprint May 2020) Conduit, Tubing and Cable Fittings
UL 651	(2011; Reprint May 2022) Schedule 40 and 80 Rigid PVC Conduit
UL 797	(2007; Reprint Mar 2021) Electrical Metallic Tubing -- Steel
UL 943	(2016; Reprint Feb 2018) Ground-Fault Circuit-Interrupters
UL 1242	(2014; Reprint Aug 2022) Electrical Intermediate Metal Conduit -- Steel
UL 1561	(2011; Reprint Jun 2015) Dry-Type General Purpose and Power Transformers

1.2 RELATED REQUIREMENTS

Section 26 00 00, "Basic Electrical Materials and Methods," applies to this section with additions and modifications specified herein

1.3 SUBMITTALS: Submit the following:

A. Manufacturer’s Catalog Data

1. Surface Raceway

1.4 QUALITY ASSURANCE

In each standard referred to herein, consider the advisory provisions to be mandatory, as though the word "shall" has been substituted for "should" wherever it appears. Interpret references in these standards to "authority having jurisdiction," or words of similar meaning, to mean Design Professional.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Materials, equipment, and devices shall, as a minimum, meet requirements of UL, where UL standards are established for those items, and requirements of NFPA 70.

2.2 CONDUIT AND FITTINGS

Shall be rigid steel (zinc-coated) conduit, rigid nonmetallic conduit, intermediate metal conduit (IMC), electrical metallic tubing (EMT), flexible metal conduit, and liquid-tight flexible conduit, conforming to the following:

A. Rigid Steel Conduit (Zinc-Coated): ANSI C80.1, UL 6.

B. Rigid Nonmetallic Conduit: PVC Type EPC-40 in accordance with NEMA TC 2.

C. Intermediate Metal Conduit (IMC): UL 1242, zinc-coated steel only.

D. Electrical Metallic Tubing (EMT):UL 797, ANSI C80.3.

E. Flexible Metal Conduit: UL 1.

1. Liquid-Tight Flexible Metal Conduit, Steel: UL 360.

F. Fittings for Metal Conduit, EMT, and Flexible Metal Conduit: UL 514B. Ferrous fittings shall be cadmium or zinc-coated in accordance with UL 514B.

1. Fittings for Rigid Metal Conduit and IMC: Threaded-type. Split couplings unacceptable.

2. Fittings for EMT: Steel or Die Cast compression type.

G. Fittings for Rigid Nonmetallic Conduit: NEMA TC 3.

2.3 SURFACE RACEWAY

Surface raceway shall be UL 5, two-piece painted steel, totally enclosed, snap-cover type.

2.4 OUTLET BOXES AND COVERS

UL 514A, cadmium- or zinc-coated.

2.5 CABINETS, JUNCTION BOXES, AND PULL BOXES

Volume greater than 100 cubic inches, UL 50, hot-dip, zinc-coated, if sheet steel.

2.6 WIRES AND CABLES

Wires and cables shall meet applicable requirements of NFPA 70 and UL for type of insulation, jacket, and conductor specified or indicated. Wires and cables manufactured more than 12 months prior to date of delivery to site shall not be used.

A. Conductors: Conductors No. 8 AWG and larger diameter shall be stranded. Conductors No. 10 AWG and smaller diameter shall be solid, except that conductors for remote control, alarm, and signal circuits, classes 1, 2, and 3, shall be stranded unless specifically indicated otherwise. Conductor sizes and ampacities shown are based on copper, unless indicated otherwise. All conductors shall be copper.

    1. Minimum Conductor Sizes: Minimum size for branch circuits shall be No. 12 AWG.

B. Color Coding: Provide for service, feeder, branch, control, and signaling circuit conductors. Color shall be green for grounding conductors and white for neutrals; except where neutrals of more than one system are installed in same raceway or box, other neutral shall be white with colored (not green) stripe. Color of ungrounded conductors in different voltage systems shall be as follows:

    1. 120/240 volt, single-phase: black and red
    2. 208/120 volt, 3-phase (1) Phase A - black (2) Phase B - red (3) Phase C - blue
    3. 480/277 volt, 3-phase (1) Phase A - brown (2) Phase B - orange (3) Phase C - yellow

C. Insulation: Unless specified or indicated otherwise or required by NFPA 70, power and lighting wires shall be 600-volt, Type THWN/THHN conforming to UL 83, except that grounding wire may be type TW conforming to UL 83; remote-control and signal circuits shall be Type TW or TF, conforming to UL 83. Where lighting fixtures require 90-degree Centigrade (C) conductors, provide only conductors with 90-degree C insulation or better.

D. Bonding Conductors: ASTM B 1, solid bare copper wire for sizes No. 8 AWG and smaller diameter; ASTM B 8, Class B, stranded bare copper wire for sizes No. 6 AWG and larger diameter.

2.7 SPLICES AND TERMINATION COMPONENTS

UL 486A-UL486B for wire connectors and UL 510 for insulating tapes. Connectors for No. 10 AWG and smaller diameter wires shall be insulated, pressure-type in accordance with UL 486A-UL486B or UL 486C (twist-on splicing connector). Provide solderless terminal lugs on stranded conductors.

A. Temperature Limitations: Contractor shall comply with the temperature limitations included in NEC Article 110-14(c). Ampacity rating of conductors shall be computed at the temperature rating of the equipment termination.

2.8 DEVICE PLATES

Provide UL listed, one-piece device plates for outlets to suit the devices installed. For metal outlet boxes, plates on unfinished walls shall be of zinc-coated sheet steel or cast metal having round or beveled edges. Plates on finished walls shall be nylon or lexan, minimum 0.03 inch wall thickness. Plates shall be same color as receptacle or toggle switch with which they are mounted. Screws shall be machine-type with

countersunk heads in color to match finish of plate. Sectional type device plates will not be permitted. Plates installed in wet locations shall be gasketed and UL listed for "wet locations."

2.9 SWITCHES

A. Toggle Switches: UL 20, totally enclosed with bodies of thermosetting plastic and mounting strap. Handles shall be ivory. Wiring terminals shall be screw-type, side-wired. Switches shall be rated quiet-type AC only, 120/277 volts, with 20 amp current rating and number of poles indicated.

B. Disconnect Switches: NEMA KS 1. Provide heavy duty-type switches where indicated, where switches are rated higher than 240 volts, and for double-throw switches. Switches serving as motor-disconnect means shall be horsepower rated. Provide switches in NEMA enclosure per NEMA ICS 6.

2.10 RECEPTACLES

UL 498 and NEMA WD 1, specification grade, heavy-duty, grounding-type. Ratings and configurations shall be as indicated. Bodies shall be of ivory thermosetting plastic supported on a metal mounting strap. Dimensional requirements shall be per NEMA WD 6. Provide screw-type, side-wired wiring terminals. Connect grounding pole to mounting strap.

A. Weatherproof Receptacles: Provide in cast metal box with gasketed, weatherproof, cast-metal cover plate and gasketed cap over each receptacle opening. Provide caps with a spring-hinged flap. Receptacle shall be UL listed for use in "wet locations with plug in use."

B. Ground-Fault Circuit Interrupter (GFI) Receptacles: UL 943, duplex type for mounting in standard outlet box. Device shall be capable of detecting current leak of 6 milliamperes or greater and tripping per requirements of UL 943 for Class A GFI devices.

C. Dryer Receptacles: NEMA 14-30 configuration, rated 30 amperes, 125/250 volts. Furnish one matching plug with each receptacle. Hubbell #HBL 9430A, Leviton #278, or equal.

D. USB Charger Type Duplex Convenience Receptacles: NEMA WD 1, NEMA WD 6 for standard configurations and UL498. Comply with USB batter charging spec USB BC1.2. Duplex, 20A, 125V, 2P, 3W, grounded with dual USB, type A and C, solid state charging ports, equal to Hubbell #USB20AC5W, or Leviton #T5833.

E. Surge Protective Receptacles: UL 1449, duplex type for mounting in standard outlet box. Devices shall be capable of EMI/RFI noise filtering and point-of-use surge protection up to 18,000 amp total surge current.

2.11 PANELBOARDS

UL 67 and UL 50. Panelboards for use as service disconnecting means shall additionally conform to UL 869. Panelboards shall be circuit breaker-equipped. Design shall be such that individual breakers can be removed without disturbing adjacent units or without loosening or removing supplemental insulation supplied as means of obtaining clearances as required by UL. Where "space only" is indicated, make provisions for future installation of breaker sized as indicated. Panelboard locks shall be keyed same. Directories shall indicate load served by each circuit of panelboard. Directories shall also indicate source of service (upstream panel, switchboard, motor control center, etc.) to panelboard. Type directories and mount in holder behind transparent protective covering.

A. Panelboard Buses: Support bus bars on bases independent of circuit breakers. Main buses and back pans shall be designed so that breakers may be changed without machining, drilling, or tapping. Provide isolated neutral bus in each panel for connection of circuit neutral conductors.

Provide separate ground bus identified as equipment grounding bus per UL 67 for connecting grounding conductors; bond to steel cabinet.

B. Circuit Breakers: UL 489, thermal magnetic-type having a minimum short-circuit current rating equal to the short-circuit current rating of the panelboard in which the circuit breaker shall be mounted. Breaker terminals shall be UL listed as suitable for type of conductor provided. Series rated circuit breakers and plug-in circuit breakers are unacceptable.

1. Multipole Breakers: Provide common trip-type with single operating handle. Breaker design shall be such that overload in one pole automatically causes all poles to open. Maintain phase sequence throughout each panel so that any three adjacent breaker poles are connected to Phases A, B, and C, respectively.

C. Manufacturer: GE Spectra bolt-on AVI, Square D Class 2441, Eaton Pow-R-Line series, or equal.

D. Identification: Provide engraved laminated-plastic or metal nameplate for each device, mounted with corrosion-resistant screws.

E.

2.12 GROUNDING AND BONDING EQUIPMENT

UL 467. Ground rods shall be copper-clad steel, with minimum diameter of 3/4 inch and minimum length of 10 feet.

2.13 TRANSFORMERS

NEMA ST 20, general purpose, dry-type, self-cooled, ventilated. Provide transformers in NEMA 1or 3R enclosure, as required. Transformer shall have 220 degrees C insulation system, with temperature rise not exceeding 115 degrees C under full-rated load in maximum ambient of 40 degrees C. Transformer shall be capable of carrying continuously 115 percent of nameplate kVA without exceeding insulation rating. Transformers shall be quiet type with maximum sound level at least 3 decibels less than NEMA standard level for transformer ratings indicated.

2.14 NAMEPLATES

Provide as specified in Section 26 00 00, "Basic Electrical Materials and Methods."

2.15 FIRESTOPPING MATERIALS

Provide asbestos free firestopping system capable of maintaining an effective barrier against flame and gases. System shall be UL listed and comply with ASTM E 814. Include UL system number, UL listed print from manufacturer for each type of floor, wall, and ceiling penetration.

PART 3 EXECUTION

3.1 INSTALLATION

Electrical installations shall conform to requirements of NFPA 70 and to requirements specified herein.

A. Service Entrance Identification: Service entrance disconnect devices, switches, and enclosures shall be labeled and identified as such.

1. Labels: Wherever work results in service entrance disconnect devices in more than one enclosure, as permitted by NFPA 70, each enclosure, new and existing, shall be labeled as one of several enclosures containing service entrance disconnect devices. Label, at minimum, shall

indicate number of service disconnect devices housed by enclosure and shall indicate total number of enclosures that contain service disconnect devices. Provide laminated plastic labels conforming to paragraph entitled "Nameplates." Use lettering of at least 0.25 inch in height, and engrave on black-on-white matte finish. Service entrance disconnect devices in more than one enclosure, shall be provided only as permitted by NFPA 70.

B. Wiring Methods: Provide insulated conductors installed in rigid steel conduit, IMC, rigid nonmetallic conduit, or EMT, except where specifically indicated or specified otherwise or required by NFPA 70 to be installed otherwise. Grounding conductor shall be separate from electrical system neutral conductor. Provide insulated green equipment grounding conductor for circuit(s) installed in conduit and raceways. Minimum conduit size shall be 1/2 inch in diameter for low voltage lighting and power circuits. Conduit which penetrates fire-rated walls, fire-rated partitions, or fire-rated floors shall be firestopped in accordance with the paragraph entitled "Firestopping Materials," specified in this section.

1. Low Voltage Wiring: Low voltage wiring such as telephone, computer, control, etc. which is run open above ceiling shall be bundled, neatly trained and supported independently from the suspended ceiling system. Wiring shall not be supported by ceiling tiles, t-bars, or ceiling support wires. Install in accordance with NEC Article 720-11 and ANSI/EIA/TIA-569. Do not support wiring from conduit, piping, or ductwork.

"Low voltage wiring shall be attached to the building structure at 4' on center (maximum), and routed as high as possible, free and clear of mechanical equipment, light fixtures, access panels and any other building equipment or items. Do not use tie straps or wire wraps to support cables. Each cable shall be continuous, with no splices from the source to the connected device. Routing shall be parallel or perpendicular to building walls. Support arrangement and tension on cables shall be sufficient to secure cables but shall not cause deformation or exceed minimum cable bending radius." Where wiring penetrates walls or ceilings, a metal conduit sleeve with bushings at each end, shall be provided for the penetration.

2. Restrictions Applicable to EMT

a. Do not install underground.
b. Do not encase in concrete, mortar, grout, or other cementitious materials.
c. Do not use in areas subject to severe physical damage including but not limited to equipment rooms where moving or replacing equipment could physically damage the EMT.
d. Do not use in hazardous areas.
e. Do not use outdoors.

3. Nonmetallic Conduit

a. Restrictions applicable to PVC Schedule 40
   1) Do not use above slab or grade.

4. Restrictions Applicable to Flexible Conduit: Use only as specified in paragraph entitled "Flexible Connections."

5. Underground Conduit: Rigid steel; steel IMC; PVC, Type EPC-40. Convert nonmetallic conduit to rigid, or IMC, steel conduit before rising through floor slab.

C. Conduit Installation: Unless indicated otherwise, conceal conduit under floor slabs and within finished walls, ceilings, and floors. Keep conduit minimum 6 inches away from parallel runs of flues and steam or hot water pipes. Install conduit parallel with or at right angles to ceilings, walls, and structural members where located above accessible ceilings and where conduit will be visible after completion of project.

1. Conduit Support: Support conduit by pipe straps, wall brackets, hangers, or ceiling trapeze. Fasten by wood screws to wood; by toggle bolts on hollow masonry units; by concrete inserts or expansion bolts on concrete or brick; and by machine screws, welded threaded studs, or spring-tension clamps on steel work. Threaded C-clamps may be used on rigid steel conduit only. Do not weld conduits or pipe straps to steel structures. Load applied to fasteners shall not exceed one-fourth proof test load. Fasteners attached to concrete ceiling shall be vibration resistant and shock-resistant. Holes cut to depth of more than 1 1/2 inches in reinforced concrete beams or to depth of more than 3/4 inch in concrete joints shall not cut main reinforcing bars. Fill unused holes. In partitions of light steel construction, use sheet metal screws. In suspended-ceiling construction, run conduit above ceiling. Do not support conduit by ceiling support system. Conduit and box systems must be supported independently of both (a) tie wires supporting ceiling grid system, and (b) ceiling grid system into which ceiling panels are placed. Supporting means shall not be shared between electrical raceways and mechanical piping or ducts. Installation shall be coordinated with above-ceiling mechanical systems to assure maximum accessibility to all systems. Spring-steel fasteners may be used for lighting branch circuit conduit supports in suspended ceilings in dry locations. Where conduit crosses building expansion joints, provide suitable expansion fitting that maintains conduit electrical continuity by bonding jumpers or other means.

2. Directional Changes in Conduit Runs: Make changes in direction of runs with symmetrical bends or cast-metal fittings. Make field-made bends and offsets with hickey or conduit-bending machine. Do not install crushed or deformed conduits. Avoid trapped conduits. Prevent plaster, dirt, or trash from lodging in conduits, boxes, fittings, and equipment during construction. Free clogged conduits of obstructions.

3. Pull Wire: Install pull wires in empty conduits. Pull wire shall be plastic having minimum 200 pound tensile strength. Leave minimum 36 inches of slack at each end of pull wire.

4. Locknuts and Bushings: Fasten conduits to sheet metal boxes and cabinets with two locknuts where required by NFPA 70, where insulated bushings are used, and where bushings cannot be brought into firm contact with the box; otherwise, use at least minimum single locknut and bushing. Locknuts shall have sharp edges for digging into wall of metal enclosures. Install bushings on ends of conduits, and provide insulating type where required by NFPA 70.

5. Flexible Connections: Provide flexible steel conduit between 3 and 6 feet in length for equipment subject to vibration, noise transmission, or movement; and for motors. Install flexible conduit to allow 20 percent slack. Minimum flexible steel conduit size shall be 1/2 inch diameter. Provide liquidtight flexible conduit in wet and damp locations for equipment subject to vibration, noise transmission, movement or motors. Provide separate ground conductor across flexible connections.

D. Boxes, Outlets, and Supports: Provide boxes in wiring and raceway systems wherever required for pulling of wires, making connections, and mounting of devices or fixtures. Boxes for metallic raceways shall be cast-metal, hub-type when located in wet locations, when surface mounted on outside of exterior surfaces, and when specifically indicated. Boxes in other locations shall be sheet steel. Each box shall have volume required by NFPA 70 for number of conductors enclosed in box. Boxes for mounting lighting fixtures shall be minimum 4 inches square, or octagonal, except that smaller boxes may be installed as required by fixture configurations, as approved. Boxes for use in masonry-block or tile walls shall be square-cornered, tile-type, or standard boxes having square-cornered, tile-type covers. Provide gaskets for cast-metal boxes installed in wet locations and boxes installed flush with outside of exterior surfaces. Provide separate boxes for flush or recessed fixtures when required by fixture terminal operating temperature; fixtures shall be readily removable for access to boxes unless ceiling access panels are provided. Support boxes and pendants for surface-mounted fixtures on suspended ceilings independently of ceiling supports, or make adequate provisions for distributing load over ceiling support members in an approved manner. Fasten boxes and supports with wood screws on wood, with bolts and expansion shields on

concrete or brick, with toggle bolts on hollow masonry units, and with machine screws or welded studs on steel. In open overhead spaces, cast boxes threaded to raceways need not be separately supported except where used for fixture support; support sheet metal boxes directly from building structure or by bar hangers. Where bar hangers are used, attach bar to raceways on opposite sides of box, and support raceway with approved-type fastener maximum 24 inches from box. When penetrating reinforced concrete members, avoid cutting reinforcing steel.

1. Boxes: Boxes for use with raceway systems shall be minimum 1 1/2 inches deep, except where shallower boxes required by structural conditions are approved. Boxes shall be minimum 4 inches square, except that 4 by 2 inch boxes may be used where only one raceway enters outlet.

2. Pull Boxes: Construct of at least minimum size required by NFPA 70 of code-gauge aluminum or galvanized sheet steel, except where cast-metal boxes are required in locations specified herein. Provide boxes with screw-fastened covers. Where several feeders pass through common pull box, tag feeders to indicate clearly electrical characteristics, circuit number, and panel designation.

E. Mounting Heights: Mount panelboards, circuit breakers, and disconnecting switches so height of operating handle at its highest position is maximum 78 inches above floor. Mount receptacles 18 inches above finished floor, and other devices, as indicated. Measure mounting heights of wiring devices and outlets to center of device or outlet.

F. Conductor Identification: Provide conductor identification within each enclosure where tap, splice, or termination is made. For conductors No. 6 AWG and smaller diameter, color coding shall be by factory-applied, color-impregnated insulation. For conductors No. 4 AWG and larger diameter, color coding shall be by plastic-coated, self-sticking markers; colored nylon cable ties and plates; or heat shrink-type sleeves.

G. Splices: Make splices in accessible locations. Make splices in conductors No. 10 AWG and smaller diameter with insulated, pressure-type connector. Make splices in conductors No. 8 AWG and larger diameter with solderless connector, and cover with insulation material equivalent to conductor insulation.

H. Covers and Device Plates: Install with edges in continuous contact with finished wall surfaces without use of mats or similar devices. Plaster fillings are not permitted. Install plates with alignment tolerance of 1/16 inch. Use of sectional-type device plates are not permitted. Provide gasket for plates installed in wet locations.

I. Electrical Penetrations: Seal openings around electrical penetrations through fire resistance-rated walls, partitions, floors, and ceilings utilizing proper firestopping materials to maintain fire resistive integrity.

J. Grounding and Bonding: In accordance with NFPA 70. Ground exposed, non-current-carrying metallic parts of electrical equipment, metallic raceway systems, grounding conductor in metallic and nonmetallic raceways, and neutral conductor of wiring systems. Make ground connection to driven ground rods on exterior of building.

1. Resistance: Maximum resistance-to-ground of grounding system shall not exceed 5 ohms under dry conditions. Where resistance obtained exceeds 5 ohms, contact Design Professional for further instructions.

K. Repair of Existing Work: Repair of existing work, demolition, and modification of existing electrical distribution systems shall be performed as follows:

1. Workmanship: Lay out work in advance. Exercise care where cutting, channeling, chasing, or drilling of floors, walls, partitions, ceilings, or other surfaces is necessary for proper installation, support, or anchorage of conduit, raceways, or other electrical work. Repair damage to buildings, piping, and equipment using skilled craftsmen of trades involved.

2. Existing Concealed Wiring to be Removed: Existing concealed wiring to be removed shall be disconnected from its source. Remove conductors; cut conduit flush with floor, underside of floor, and through walls; and seal openings.

3. Removal of Existing Electrical Distribution System: Removal of existing electrical distribution system equipment shall include equipment's associated wiring, including conductors, cables, exposed conduit, surface metal raceways, boxes, and fittings, back to equipment's power source as indicated.

4. Continuation of Service: Maintain continuity of existing circuits of equipment to remain. Existing circuits of equipment shall remain energized. Circuits which are to remain but were disturbed during demolition shall have circuits wiring and power restored back to original condition.

L. Panelboard Modifications: At the completion of the project, the Contractor shall provide a new typed index for all panels in this building affected by this work.

3.2 FIELD QUALITY CONTROL

A. Devices Subject to Manual Operation: Each device subject to manual operation shall be operated at least five times, demonstrating satisfactory operation each time.

B. 600-Volt Wiring Test: Test wiring rated 600 volt and less to verify that no short circuits or accidental grounds exist. Perform insulation resistance tests on wiring No. 6 AWG and larger diameter using instrument which applies voltage of approximately 500 volts to provide direct reading of resistance. Minimum resistance shall be 250,000 ohms.

C. Transformer Tests: Perform test classified as routine in accordance with NEMA ST 20 on each transformer.

D. GFI Receptacle Test: Test GFI receptacles with a "load" (such as a plug in light) to verify that the "line" and "load" leads are not reversed.

E. Grounding System Test: Test grounding system to ensure continuity, and that resistance to ground is not excessive. Test each ground rod for resistance to ground before making connections to rod; tie grounding system together and test for resistance to ground. Make resistance measurements in dry weather, not earlier than 48 hours after rainfall. Submit written results of each test to Design Professional, and indicate location of rods as well as resistance and soil conditions at time measurements were made.

END OF SECTION 26 20 00

SECTION 26 51 00 - INTERIOR LIGHTING

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI C78.377	(2017; R2022) American National Standard for Electric Lamps—Specifications for the Chromaticity of Solid State Lighting (SSL) Products

ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA (IESNA)

IES HB-10-11	(2011; Errata 1 & 2: 2015) IES Lighting Handbook, Tenth Edition

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA SSL 1	(2016) Electronic Drivers for LED Devices Arrays, or Systems
NEMA SSL 6	(2010) Solid State Lighting for Incandescent Replacement—Dimming
NEMA SSL 7A	(2015) Phase Cut Dimming for Solid State Lighting for Incandescent Replacement

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2020) National Electrical Code
NFPA 101	(2021) Life Safety Code

UNDERWRITERS LABORATORIES INC. (UL)

UL 20	(2018; Reprint Oct 2020) General-Use Snap Switches
UL 924	(2016; Reprint May 2020) Emergency Lighting and Power Equipment
UL 1598	(2021; Reprint Mar 2021) Luminaires

1.2 RELATED REQUIREMENTS

Section 26 00 00, "Basic Electrical Materials and Methods," applies to this section, with the additions and modifications specified herein. Materials not considered to be lighting equipment or lighting fixture accessories are specified in Section 26 20 00, "Interior Distribution System." Lighting fixtures and accessories mounted on exterior surfaces of buildings are specified in this section.

1.3 DEFINITIONS

A. Average Life: Time after which 50 percent will have failed and 50 percent will have survived under normal conditions.
B. Total Harmonic Distortion (THD): The root mean square (RMS) of all the harmonic components divided by the total fundamental current.

1.4 SUBMITTALS

Submit the following: Data, drawings, and reports shall employ the terminology, classifications, and methods prescribed by the IESNA HB-10-11, as applicable, for the lighting system specified.

A. Manufacturer's Catalog Data

1. Solid State (LED) lighting fixtures
2. Dimmer switch
3. Photocell switch
4. Exit signs
5. Emergency lighting equipment
6. Occupancy sensors

PART 2 PRODUCTS

2.1 SOLID STATE (LED) LIGHTING FIXTURES: ANSI C78.377A, NEMA SSL 1, UL 1598.

A. Provide the lumen output, wattage, and color temperature indicated.

B. Dimmer Switch: 0 -10 volt type for use with LED drivers.

2.2 PHOTOCELL SWITCH

UL 773A, hermetically sealed cadmium-sulfide or silicon diode type cell rated 120 volts ac, 60 Hz with single-throw contacts. Switch shall tun on at or below 3 footcandles and off at 2 to 10 footcandles. A time delay shall prevent accidental switching from transient light sources. Provide switch is a cast weatherproof aluminum housing with adjustable window slide, rated 1800 VA, minimum.

2.3 EXIT SIGNS

UL 924, NFPA 70, and NFPA 101. Exit signs shall be self-powered type.

A. Self-Powered LED Type Exit Signs (Battery Backup): Provide with automatic power failure device, integral self-testing module and fully automatic high/low trickle charger in a self-contained power pack. Battery shall be sealed electrolyte type, shall operate unattended, and require no maintenance, including no additional water, for a period of not less than five years. LED exit sign shall have emergency run time of 1 1/2 hours (minimum).

2.4 EMERGENCY LIGHTING EQUIPMENT

UL 924, NFPA 70, and NFPA 101. Provide lamps in wattage indicated.

A. Emergency Lighting Unit: Provide as indicated. Emergency lighting units shall be rated for 6 volts. Provide integral self-testing module.

2.5 SELF-TESTING MODULE

Self-testing module for exit signs and emergency lighting equipment shall perform the following functions:

A. Continuous monitoring of charger operation and battery voltage with visual indication of normal operation and of malfunction.
B. Monthly discharge cycling of battery with monitoring of transfer circuit function, battery capacity and emergency lamp operation with visual indication of malfunction. The battery capacity test may be conducted by using a synthetic load.
C. Manual test switch to simulate a discharge test cycle.

D. Module shall have low voltage battery disconnect (LVD) and brown-out protection circuit.

2.6 OCCUPANCY SENSORS

UL listed. Occupancy sensors and power packs shall be designed to operate on the voltage indicated. Sensors and power packs shall have circuitry that only allows load switching at or near zero current crossing of supply voltage. Occupancy sensor mounting as indicated. Sensor shall have an LED occupant detection indicator. Sensor shall have adjustable sensitivity and adjustable delayed-off time range of five minutes to fifteen minutes, minimum. Wall mounted sensors shall be ivory, ceiling mounted sensors shall be white. Ceiling mounted sensors shall have 360 degree coverage unless otherwise indicated. Wall mounted sensors shall have integral manual “off” switch.

A. Ultrasonic sensor shall be crystal controlled and shall not cause detection interference between adjacent sensors.
B. Infrared sensors shall have a daylight filter. Sensor shall have a fresnel lens that is applicable for indicated usage.
C. Ultrasonic/Infrared Combination Sensor

Occupancy detection to turn lights on required both ultrasonic and infrared sensor detection. Lights shall remain on if either the ultrasonic or infrared sensor detects movement. Infrared sensor shall have lens selected for indicated usage and daylight filter to prevent short wavelength infrared interference. Ultrasonic sensor frequency shall be crystal controlled.

PART 3 EXECUTION

3.1 INSTALLATION

Set lighting fixtures plumb, square, and level with ceiling and walls, in alignment with adjacent lighting fixtures, and secure in accordance with manufacturers' directions and approved drawings. Installation shall meet requirements of NFPA 70. Mounting heights specified or indicated shall be to the bottom of fixture for ceiling-mounted fixtures and to center of fixture for wall-mounted fixtures. Obtain approval of the exact mounting for lighting fixtures on the job before commencing installation and, where applicable, after coordinating with the type, style, and pattern of the ceiling being installed.

A. Exit Signs and Emergency Lighting Units: Wire exit signs and emergency lighting units ahead of the switch to the normal lighting circuit located in the same room or area.
B. Occupancy Sensor: Provide quantity of sensor units indicated as a minimum, provide additional units to have full coverage over controlled area. Full coverage shall provide hand and arm motion detection for office and administration type areas and walking motion for industrial areas, warehouses, storage rooms and hallways. Locate the sensor(s) as indicated and in accordance with the manufacturer’s recommendations to maximize energy savings to avoid nuisance activation and deactivation due to sudden temperature or airflow changes and usage.

3.2 FIELD QUALITY CONTROL

Upon completion of installation, conduct an operating test to show that equipment operates in accordance with requirements of this section.

A. Electronic Dimming Driver: Test for full range of dimming capability. Observe for visually detectable flicker over full dimming range.
B. Occupancy Sensor: Test sensors for proper operation. Observe light control over entire area being covered.

END OF SECTION 26 51 00

DIVISION 27
COMMUNICATION

27 10 00 Voice/Data Telecommunications System

SECTION 27 10 00
VOICE/DATA TELECOMMUNICATIONS SYSTEM

PART 1 - GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI C80.3 (2015) American National Standard for Electrical Metallic Tubing (EMT)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (2014) National Electrical Code

TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA)

TIA 568-C.1 (2009) Commercial Building Telecommunications Cabling Standards

TIA 568-C.2 (2009) Transmission Performance Specifications for 4-Pair 100 Ω Category 5e Cabling

TIA 569 (2019) Commercial Building Standard for Telecommunication Pathways and Spaces

1.2 RELATED REQUIREMENTS

Section 26 00 00, “Basic Electrical Materials and Methods,” and Section 26 20 00, “Interior Distribution Systems” apply to this section with additions and modifications specified herein.

1.3 SUBMITTALS: Submit the following:

A. Manufacturer's Catalog Data

1. Voice/Data jacks, wiring, patch panels, and punch down blocks
2. 19" racks (wall and floor mounted)
3. Fiber Optic cable and lightguide interconnect unit (LIU)

Submittals shall include complete catalog and other information shown to describe the cable, wire and equipment proposed to be furnished and to verify compliance with this specification. If any material other than the materials mentioned in this specification are used, product material samples with specifications are to be provided for approval, prior to the bid.

1.4 QUALITY ASSURANCE

In each standard referred to herein, consider the advisory provisions to be mandatory, as though the word “shall” has been substituted for “should” wherever it appears. Interpret references in these standards to “authority having jurisdiction,” or words of similar meaning, to mean Design Professional.

All work and equipment shall conform to the appropriate portions of the following specifications, codes and regulations:

A. Building Industry Consulting Services International (BICSI)
B. Telecommunications Distribution Methods Manual
C. BOCS and AT&T Plant Standards
D. ANSI/EIA/TIA Standards
E. Rural Utilities Services (RUS) Specifications PE-89
F. National Electrical Code (NEC)
G. Any Applicable State and Local Codes

1.5 COORDINATION OF WORK

Certain final connections and tie connections are to be defined by the Office of Telecommunications Management (OTM). The contractor is to coordinate with the OTM representative so that the tie work and final connection can be accomplished in an orderly and timely manner.

1.6 QUALIFICATIONS OF INSTALLER

All telephone and data wiring work is to be performed by a qualified telecommunications subcontractor regularly employed in this field. The subcontracting company performing the telecommunications work must have been continuously in the telecommunications business for at least the past five consecutive years. All work is to be performed under the electrical contract. The electrical contractor shall have overall responsibility and shall coordinate all requirements for the system. The telecommunications subcontractor shall have a BICSI certified Registered Communications Distribution Designer (RCDD) on staff. All qualifications, including the firm's facilities, shall be available for inspection by the owner and/or architect.

PART 2 - PRODUCTS

2.1 COPPER TRANSMISSION MEDIA

A. STATION TELEPHONE CABLE: Station telephone cables shall be enhanced Category 8 compliant (as described in Addendum No. 5 to TIA/EIA-568-C specifications and as listed in the most recent UL Directory) 100 ohms, four-pair, 23 gauge copper, plenum-rated, unshielded twisted pair cables. The outer jacket of the cable shall be BLUE in color. Use one of the following products or an equivalent as pre-approved.

CommScope:	Cat 8, plenum rated, blue jacket	Cat 8, Blue - part # 5504M BLUE
NORDX/CDT:	Cat 8, plenum rated, blue jacket	Cat 8, Blue - product IBNFlex-1213
Berk-Tek:	Cat 8, plenum rated, blue jacket	Cat 8, Blue - part # 6-57825-2

B. STATION DATA NETWORK CABLE: Station data network cables shall be Enhanced Category 8 compliant (as described in Addendum No. 5 to TIA/EIA-568-C standard and as listed in the most recent UL Directory) 100 ohms, four-pair, 24 gauge copper, plenum-rated, unshielded twisted pair cables. The outer jacket of the cable shall be WHITE in color. Use one of the following products or an equivalent as pre-approved:

CommScope:	Cat 8, plenum rated, white jacket	Cat 8, White - part # 5504M WHITE
NORDX/CDT:	Cat 8, plenum rated, white jacket	Cat 8, White - product IBDNFlex-1213
AMP:	Cat 8, plenum rated, white jacket	Cat 8, White - part # 6-57825-2

Note: All horizontal distribution runs shall work together to produce optimum efficiency and throughput. All cable and jack combinations must be tested by an independent laboratory to determine their performance when paired together. Two such independent testings are Anixter's "Levels" Program and Graybar's "VIP" Program. DO NOT substitute Anixter's and Graybar's programs levels for a category rating. Anixter's Level 6 rating does not rate the

cable and connector at category 6 rating. It is the responsibility of the contractor to make sure that both jack and wire are of the same "category" rating.

2.2 FIBER OPTIC TRANSMISSION MEDIA

A. OUTSIDE MULTIMODE OPTIC CABLE: Outside multimode fiber optic cable shall have the following characteristics:

1. The cable shall have an overall PVC jacket/sheath. The jacket/sheath shall be abrasion resistant, impervious to light or water.
2. Individual fiber strands shall be color coded per telecommunications industry practice.
3. Number of strands shall have the following characteristics:

    a. Fiber Type: Multi-mode, glass core, glass cladding.
    b. Core Diameter: 62.5 microns, ±3 microns
    c. Core/Clad Concentricity Error: < or = 3.0 micron.
    d. Cladding Diameter: 125 microns ±1 micron.
    e. Cladding Noncircularity: < or = 1%.
    f. Maximum attenuation at 850 nanometers (nominal) 3.75 dB/km.
    g. Maximum attenuation at 1300 nanometers (nominal) 1.5 dB/km.

Use one of the following products or an equivalent as pre-approved:

Optical Cable Corp: Part designation DXO 24D (24 strand)

Lucent: Part designation LGBC 24 LRX (24 strand)

B. INSIDE MULTIMODE OPTICAL CABLE: Inside multimode fiber optic cable shall have the following characteristics:

1. The cable shall have an overall jacket/sheath rated, per NEC code, for the environment in which it will pass through, i.e. “CMP” if the cable passes through any plenum space.
2. Individual fiber strands shall be color coded per telecommunications industry practice.
3. Cable shall be 24 strand.
4. Fiber strands shall have the following characteristics:

    a. Fiber Type: Multi-mode, glass core, glass cladding.
    b. Core Diameter: 62.5 microns ±3 microns.
    c. Core/Clad Concentricity Error: < or = 3.0 microns.
    d. Cladding Diameter: 125 microns ±1 micron.
    e. Cladding Noncircularity: < or = 1%.
    f. Maximum attenuation at 850 nanometers (nominal) 3.75 dB/km.
    g. Maximum attenuation at 1300 nanometers (nominal) 1.5 dB/km.

Use one of the following products or an equivalent as pre-approved:

Optical Cable Corp: 24 strand part designation DXO24D

Lucent: Part designation LGBC 24 LRX

2.3 MODULAR PATCH PANELS

All telephone and data wiring shall terminate on modular patch panels. The modular patch panel shall be constructed to accept the same modular jack that will be used at the station outlet. Modular patch panels shall be of the same manufacturer as the modular jack and shall be sized to accommodate the appropriate number of jacks. The panel shall fit in a 19 inch rack and be colored black. Use the following products or equivalent as pre-approved:

Panduit:	MINI-COM Snap-in faceplate Patch Panels	
	24 port - part #CPP24WBL	48 port - part #CPP48WBL
NORDX/CDT:	MDVO Patch Panels	
	24 port - part # NXPPM1U24EB	48 port - part # NXPPM1U48EB
AMP:	SL Series Multimedia Jack Patch Panels	
	24 port - part #1375291-1	48 port - part #1375292-1

2.4 MODULAR JACKS

Modular jacks shall be constructed in such a manner that no special tool is needed to perform the physical connections (no special crimp or punch down tool). The jack shall be color coded to install wire to ANSI/TIA/EIA-568-C wiring standard. The jack shall be of the appropriate category compliance to match the wire to be terminated (Cat 8 compliant jack on Cat 8 wire). The telephone jacks shall be Electrical Ivory in color and the data jacks shall be Gray in color. Use the following products or equivalent:

Panduit:	Cat 8 MINI-JACK
	Electrical Ivory colored Mini-Jack - part #CJ588BEI
	Light Gray colored Mini-Jack - part #CJ588BIG
	Panduit Cat 8 Mini-Jacks are designed to meet Cat 8 rating
NORDX/CDT:	Cat 8 EZ-MDVO modules
	Almond colored module part # NXM1U8NB-02
	Gray colored module part # NXM1U8NB-01
	NORDXs EZ-MDVO modules are designed to meet Cat 8 rating
AMP:	Cat 8 Toolless Jack
	Electrical Ivory - part #1-1116604-1
	Light Gray - part #1116604-4
	AMP Cat 8 Toolless Jack are designed to meet Cat 8 rating.

Note: All horizontal distribution runs shall work together to produce optimum efficiency and throughput. All cable and jack combinations must be tested by an independent laboratory to determine their performance when paired together. Two such independent testings are Anixter's "Levels" Program and Graybar's "VIP" Program. DO NOT substitute Anixter's and Graybar's programs levels for a category rating. Anixter's Level 6 rating does not rate the cable and connector at category 6 rating. It is the responsibility of the contractor to make sure that both jack and wire are of the same "category" rating.

2.5 STATION OUTLET FACEPLATE

Station outlet faceplates shall be single gang and manufactured to accept the modular jack specified. Unless otherwise noted on drawing all faceplates shall be electrical ivory/almond in color. Use the following products or equivalent as pre-approved:

Panduit: MINI-COM Faceplate (Electrical Ivory)
1 port - part # CFP1EI
2 port - part # CFP2EI
4 port - part # CFP4EI

NORDX/CDT: MDVO Faceplate (Almond)
1 port - part # QNE4PA1F1(102)
2 port - part # QNE4PA1F2(102)
4 port - part # QNE4PA1F4(102)

AMP: Faceplate (Electrical Ivory)
2 port - part # 1-569084-1
4 port - part # 1-569086-1
6 port - part # 1-569088-1

2.6 FIBER TERMINATIONS

A. FIBER LIGHTGUIDE INTERCONNECT UNIT (LIU): Fiber LIUs shall be manufactured to fit in a 19-inch relay rack. The LIU shall be sized to accommodate the number of fiber connections and utilize the least amount of rack space. Even if the LIU is not fully populated with fiber connections, the LIU shall be completely populated with bulkhead panels to accommodate future use.

1. FIBER CONNECTORS: All mulitmode fiber shall be terminated using ST type connectors. Use one of the following products or an equivalent as pre-approved.

   Siecor: Part designation - 95-130-44-BPXY

   Lucent: Product Code - 2020C

   The connectors for multimode fiber shall be produced by the same manufacturer that supplied the couplers.

2. FIBER COUPLERS: All mulitmode fiber LIU panels shall be equipped with ST to ST couplers. Use one of the following products or an equivalent as pre-approved.

   Siecor: Part number - TER-067-M

   Lucent: Part number - C2000A2

   The couplers multimode fiber shall be produced by the same manufacturer that supplied the connectors.

2.7 SPLICING HARDWARE

A. SPLICE CASE: All splice cases shall be specified for the particular environment in which they will be placed and shall be sized to accommodate the cable count spliced. End plates shall be designed for the number and size of the cables served by the splice and shall be designed to seal around each cable individually. All splice cases shall be re-enterable and shall contain all necessary equipment to be installed properly, adhering to all appropriate electrical codes.

B. FIBER SPLICE UNIT: All fiber splices shall be preformed using fusion splice technology.

2.8 RELAY RACK

Relay racks are to be brushed aluminum, height seven (7') feet, nineteen (19") inch rack space. Panel mounting holes are to be #12-24 tapped on EIA universal spacing on both front and rear of rack. Rack to be self supporting with base suitable to floor mount.

2.9 SURFACE RACEWAY

The surface raceway shall be constructed of plastic (non- metallic). The raceway shall have a single channel construction with a snap-on detachable cover and shall be sized to fit the application. All appropriate fittings (i.e., elbows and tees) with the proper bend radius shall be supplied to create a complete raceway system. All outlet boxes and faceplates shall accept the modular jack bid on the project and shall allow adherence to the proper bend radius of the cable installed. Use one of the following manufacturer's product systems or an equivalent as pre-approved:

- o Panduit
- o Hubbell

2.10 EQUIPMENT RACK

Equipment racks shall be constructed of aluminum, shall be 19 inches wide, and floor or wall mountable as indicated. All floor mounted racks shall be anchored using drop in anchor bolts.

PART 3 - EXECUTION

3.1 INSTALLATION

Installation shall conform to the requirements of NFPA 70, Section 26 20 00 “Interior Distribution System“ and the requirements stated herein.

3.2 TELECOMMUNICATIONS ROOM

A. ELECTRICAL SERVICE: Telecommunications rooms shall contain one double duplex 120V 20A non-switched receptacle for each thirty-two square feet (i.e. 4' x 8') of wall space. Each receptacle shall be wired to an individual 20A breaker and the breaker panel shall be clearly marked with the word "COMMUNICATIONS", the telecommunications room number and the receptacle number. Receptacles should be evenly placed around the telecommunications room, twelve to eighteen inches (12" - 18") from the floor, in accordance with NEC specifications and/or local fire codes.

B. GROUNDING SYSTEM: All Telecommunications rooms shall be provided with a common ground system. The telecommunications room ground system shall connect to the main building protective ground at a single point only. The protective ground connection point shall NOT be made to electrical conduits, power distribution box grounds or neutral busses. The intent is to provide all telecommunications rooms with a common ground, which will not be affected by any other electrical work. The telecommunications room ground system shall consist of a #2 AWG solid copper conductor, green insulated ground wire which shall interconnect all equipment rooms. Ground lugs shall be provided in each equipment room. The wire shall be routed through the telecommunications room such that additional ground lugs may be installed when needed.

C. WALL AND FLOOR PREPARATION: All telecommunications room walls must be covered with three-quarter inch (3/4") indoor grade plywood to a height of eight feet (8') or to the ceiling, whichever is lower. All plywood backboards must be painted with two coats of nonconductive, fire retardant paint. Due to dusting characteristics

of concrete, all such interior surfaces should be painted or tiled and finished in a light color to increase illumination. Paint should be free from turpentine. Telecommunications rooms will not be carpeted.

3.3 HORIZONTAL CABLING

Services between Communication Closets: Each TR (telecommunications room) shall be provided with feeder cables from the entrance TR. Feeder cable shall be 24 strand multimode fiber. As a minimum each TR shall be serviced from the entrance TR with a multimode fiber optic cable. The sheath of the cables being pulled shall be rated to be installed in all environments in which that particular cable will pass through; i.e. horizontal, plenum, riser, etc.

Services between TR and Workstation: Standard Horizontal Distribution runs shall consist of plenum rated Category 8 compliant (as listed in the most recent UL Directory) four-paired unshielded twisted pair voice cables, blue in color and plenum rated Category 8 compliant four-paired unshielded twisted pair data cables, white in color in the quantities indicated on the plans.

The contractor shall maintain recommended Category 8 bending radius, pulling tension, and cable support requirements. All cables, wires, and equipment shall be securely and neatly installed. Inside routing shall be installed parallel and perpendicular to existing structural lines and members. Cable ties may be used but shall be installed finger tight.(By finger tight installer must be able to insert his or her small finger into the cable tie with the cable bundle.)

All horizontal distribution runs shall work together to produce optimum efficiency and throughput. All cable and jack combinations must be tested by an independent laboratory to determine their performance when paired together. Two such independent testings are Anixter's "Levels" Program and Graybar's "VIP" Program. DO NOT substitute Anixter's and Graybar's programs levels for a category rating. Anixter's Level 6 rating does not rate the cable and connector at category 6 rating. It is the responsibility of the contractor to make sure that both jack and wire are of the same "category" rating.

3.4 CABLE TERMINATION

A. ENTRANCE & TELECOMMUNICATION ROOM

1. Telephone and Data distribution cables: (equipment room to station) shall be terminated on patch panels, attached to the very top or immediately below a fiber patch panel on the equipment rack.

2. Cable management shall be a style appropriate to handle front, rear, vertical and horizontal cross connect wire and patch cords pathways on a communications backboard or on a standard nineteen (19") inch rack. Oversize cable management to meet larger-capacity requirements for Category 8 patch cords and fiber patch cords.

3. Multimode fiber cable is to be terminated using ST type fiber connectors in rack mounted lightguide panels.

4. The LIU to be installed shall be constructed to accept the proposed couplers. If more than one cable is to be installed in a single telecommunications closet, the contractor shall determine the size and number of LIUs that should be installed to take up the least amount of space in the rack as possible.

B. WORKSTATION: Work Area Outlets shall consist of a standard double gang deep (minimum 2.125" depth)electrical box with a single gang sheet rock collar. The outlet will be complete with Category 8 rated RJ45 jacks (terminated) for voice, and Category 8 rated RJ45 jacks (terminated) for data, in the quantity indicated on the plans. All RJ45 jacks shall be terminated using the EIA/TIA 568B pin out. All telephone jacks shall be electrical ivory in color and all data jacks shall be gray in color. Station jacks shall be terminated with a minimum of 9" of slack in the outlet box. All pairs of the station cable shall be terminated.

3.5 CABLE SPLICING

A. INSIDE COPPER CABLE: There shall be NO splices in station cable (telephone or data). If a cable is damaged or does not pass testing and acceptance procedures, that cable must be removed and replaced at contractor's expense.

B. FIBER OPTIC CABLE: All splices shall use a splice case specified for the particular environment in which they will be placed and shall be sized to accommodate the cable count spliced. All splices shall be performed using fusion technology. The fusion splice machine shall be capable of splicing using Local Injection and Detection (LID) technique.

3.6 CONDUIT

A. CONNECTING COMMUNICATIONS ROOMS

1. A minimum of two three-inch conduits shall connect any communications equipment room(s) with the other communications equipment room(s).
2. All conduits shall contain a suitable pull string or wire.
3. All conduits shall have a bushing on each end to prevent abrasion of cable.
4. All conduit penetrations shall be appropriately fire stopped to comply with all fire and life safety codes.
5. All conduit turns shall be sweeping turns (no "LBs"). Conduit runs shall contain no more than the equivalent of two sweeping 90 degree turns with the installation of a suitably sized pull box. Pull box size shall be dependent on the particular installation but shall be no less than twelve-inches by twelve-inches (12" x 12") in the plane of the conduits, and no less than six inches (6") deep. Location of all pull boxes shall be shown on drawings furnished by the contractor.

B. WORKSTATION

1. The receptacle box shall have a minimum depth of 2-1/8 inches, not including the cover or shroud. Receptacle boxes may be metal or plastic, and consistent with the National Electrical Code. Each receptacle box shall be furnished with a single-gang cover/plaster ring of appropriate depth for the particular type of wall construction used.
2. Each receptacle box shall be provided with a minimum of a single three-quarter inch (3/4") conduit which shall be home-run back to the serving communications equipment room or stubbed up into an accessible ceiling area with a pathway to the serving equipment room.
3. All conduits shall contain a suitable pull string or wire.
4. All conduit penetrations shall be appropriately fire stopped to comply with all fire and life safety codes.
5. All conduit turns shall be sweeping turns (no "LBs"). Conduit runs shall contain no more than the equivalent of two sweeping 90 degree turns with the installation of a suitably sized pull box. Pull box size shall be dependent on the particular installation but shall be no less than twelve-inches by twelve-inches (12" x 12") in the plane of the conduits, and no less than six inches (6") deep. Location of all pull boxes shall be shown on drawings furnished by the contractor.

3.7 LABELING

A. Permanently label all terminal strips, junction boxes, pull points and conduit runs as per the telephone industry standards and these specifications.

B. Equipment room terminations:

Telephone and data outlets: All telecommunications outlets shall be numbered with the official room number followed by a period, followed by the telecommunications outlet number in that room. Telecommunications outlet numbers are to be assigned sequentially in a room. Use only final approved room numbers (not

necessarily the room numbers listed on the drawings) jack position numbers are: "1" for top left, "2" for bottom. left. For example, a cable serving Room 1103-B, Outlet No. 2, Jack Position 1, would be marked in the equipment room as "1103-B.2.1". (No permanent marker ink pen labeling shall be allowed..)

Each cable entering the equipment room shall be marked with the room number using the final approved room numbers (not necessarily the room numbers listed on the drawings), outlet number and jack position number indicating where the other end of the cable is terminated.

3.8 TESTING

A. MULTIMODE FIBER OPTIC CABLE:

1. All multimode fiber cables shall be tested at both 850 nm and 1300 nm after installation. Printed test results for each fiber strand are required. All tests are to be performed in accordance with ANSI/TIA/EIA-526-7, Method A.1, One Reference Jumper. Fibers will be considered acceptable if the OTDR trace for the fiber shows an end-to-end loss of less than xxdB + yy(0.2)dB + zz(0.5)dB (where yy is the number of splices, zz is the number of connector pairs and xx is calculated using the following formula: xx=distance X fiber attenuation/unit distance @ lambda). In addition, no splice may show a loss of greater than 0.2 dB and no connector pairs may show a loss of greater than 0.2 dB and no connector pairs may show a loss of greater than 0.5 dB. Any additional tests required by the ANSI/TIA/EIA standard shall also be performed and also included in the written test report.

2. The vendor shall test each fiber strand utilizing a OTDR bi-directional tester at the wavelengths specified above. Overall, the OTDR test results shall be made up of the wavelength of the conducted test, the link length, attenuation, cable identification, and the locations of the near end, the far end and each splice point or points of discontinuity. Hard-copy results for each fiber strand shall be submitted as part of “As-Built” documentation.

3. If the cable fails to meet the above requirements, it shall be replaced by the contractor at the contractor’s expense.

B. STATION CABLE

1. CATEGORY 8 ENHANCED CABLE

All category 8 enhanced cable shall be meet the following performance from IDF termination to outlet jack:

Frequency (MHz)	Maximum Attenuation (dB)	Maximum NEXT (dB)
1	2.2	54.5
4	4.2	49.5
11	7.0	44
16	8.76	40.5
20	10.0	38.5
100	23.5	27

END OF SECTION

DIVISION 28

ELECTRONIC SAFETY AND SECURITY

28 31 00 Interior Fire Detection & Alarm System

SECTION 28 31 00 - INTERIOR FIRE DETECTION AND ALARM SYSTEM

PART 1 - GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI C80.1	(2020) Electrical Rigid Steel Conduit (ERSC)
ANSI C80.3	(2020) Steel Electrical Metallic Tubing (EMT)

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

ASME A17.1/CSA B44	(2019) Safety Code for Elevators and Escalators

BUILDER HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

BHMA A156.15	(2021) Release Devices Closer Holder, Electromagnetic and Electromechanical

FACTORY MUTUAL ENGINEERING AND RESEARCH CORPORATION (FM)

FM P7825	Approval Guide (Updated on-line)

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC. (IEEE)

IEEE C62.41	(1991; R1995) Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2020) National Electrical Code
NFPA 72	(2022) National Fire Alarm Code
NFPA 90A	(2021) Standard for the Installation of Air Conditioning and Ventilating Systems
NFPA 1221	(2019) Installation, Maintenance and Use of Emergency Services Communications Systems

UNDERWRITERS LABORATORIES INC. (UL)

UL FPED	(2012) Fire Protection Equipment Directory
UL 5	(15th Edition - May 2016) UL Standard for Safety Surface Metal Raceways and Fittings
UL 6	(2007; Reprint Sep 2019) Electrical Rigid Metal Conduit - Steel

UL 467	(11th Edition - Apr 2022) Grounding and Bonding Equipment
UL 497B	(2004; Reprint Feb 2022) Protectors for Data Communication and Fire Alarm Circuits
UL 514A	(2013; Reprint Aug 2017) Metallic Outlet Boxes
UL 514B	(2012; Reprint May 2020) Conduit, Tubing and Cable Fittings UL
797	(2007; Reprint Mar 2021) Electrical Metallic Tubing -- Steel
UL 1242	(2006; Reprint Apr 2022) Electrical Intermediate Metal Conduit -- Steel UL
1449	(2021) Surge Protective Devices
UL 1971	(2002; Reprint Aug 2018) Signaling Devices for the Hearing Impaired

1.2 RELATED REQUIREMENTS

Section 26 00 00, "Basic Electrical Materials and Methods" applies to this section with additions and modifications specified herein.

1.3 DESCRIPTION OF WORK

The work includes upgrading or replacing (if necessary) existing interior addressable, remote station reporting, fire alarm system, including material, tools, equipment, installation, and testing necessary for and incidental to the provision of a complete and usable system conforming to the applicable requirements of NFPA 70, NFPA 72, NFPA 90A, and the Office of the State Fire Marshal and this specification. In referenced NFPA publications, the advisory provisions shall be mandatory, as though the word "shall" had been substituted for "should" wherever it appears; reference to the "authority having jurisdiction" shall be interpreted to mean the Design Professional. Materials and equipment to be furnished under this contract shall be essentially the current design products of manufacturers regularly engaged in production of such equipment and shall be listed by the Underwriters' Laboratories, Inc. in the UL FPED, or approved by Factory Mutual System and listed in FM P7825. The existing system is manufactured by Siemens, FireFinder Model #XLS.

1.4 SUBMITTALS

Submit the following in the format required for review by the Office of the State Fire Marshal. The Contractor shall make his submittal through the Fire Marshal’s website and shall name ADG, Inc. as the Professional of Record. He shall list the Architect’s and the General Contractor’s email address as “shared entities.” ADG, Inc. must receive a system generated pin code to electronically verify the online submittal.

A. Manufacturer's Catalog Data

1. Control panel and modules
2. Storage batteries
3. Battery charger
4. Manual pull stations
5. Heat detectors
6. Open-area (spot-type) smoke detectors
7. Duct smoke detectors

8. Alarm speakers
9. Visible appliances
10. Main annunciator
11. Remote annunciator panel
12. Digital alarm communicating transmitter (DACT)

Data which describes more than one type of item shall be clearly marked to indicate which type the Contractor intends to provide. Submit one original for each item and clear, legible, first-generation photocopies for the remainder of the specified copies. Incomplete or illegible photocopies will not be accepted. Partial submittals will not be accepted.

B. Drawings

1. System floor plans
2. System wiring diagrams

a. System Floor Plans: Submit shop drawings of the system floor plans showing locations of initiating and indicating appliances and end-of-line supervisory devices. Show wire color coding, wire counts, and device wiring order. Show candela rating of each visible notification appliance.

b. System Wiring Diagrams: Submit complete wiring diagrams of the system showing points of connection and terminals used for all electrical connections in the system. Show all modules, relays, switches and lamps in the control panel.

C. Design Data

1. Power calculations

a. Power Calculations: Submit design calculations to substantiate that the battery capacity exceeds supervisory and alarm power requirements. Show comparison of the detector power requirements per zone versus the control panel smoke detector power output per zone in both the standby and alarm modes. Show comparison of the notification appliance circuit alarm power requirements with the rated circuit power output.

1.5 QUALITY ASSURANCE

A. Qualifications of Installer: The Contractor or installer shall have satisfactorily installed fire alarm systems of the same type and design as specified herein and shall be licensed by the State of Louisiana as a Fire Alarm Contractor.

B. Manufacturer's Representative: Provide the services of a representative or technician from the manufacturer of the system, experienced in the installation and operation of the type of system being provided, to supervise installation, adjustment, preliminary testing, and final testing of the system and to provide instruction to Owner’s personnel.

C. Qualifications of System Technician: Installation drawings, shop drawings and as-built drawings shall be prepared by, or under the supervision of, a qualified technician. Qualified technician shall be an individual who is experienced with the types of work specified herein, and is currently certified by the National Institute for Certification in Engineering Technologies (NICET) as an engineering technician with minimum Level III certification in fire alarm system program.

1.6 SPARE PARTS: Furnish the following spare parts:

A. 5 complete sets of system keys
B. 1 of each type of audible and visual alarm device installed
C. 2 of each type of fuse required by the system
D. 2 of each type of smoke detector base and head installed
E. 1 smoke detector manufacturer's test screen, card or magnet for each 10 detectors, or fraction thereof, installed in the system

PART 2 - PRODUCTS

2.1 SYSTEM DESIGN

A. Operation: Provide a complete, electrically supervised, remote station reporting, manual and automatic, addressable, annunciated, fire alarm system as described herein, and as shown on the drawings.

1. Fire Alarm Signal Initiation: Operation shall be such that actuation of any:

   a. Manual station
   b. Heat detector
   c. Smoke detector
   d. Automatic fire sprinkler system

   Shall cause all of the following actions:

   a. All building evacuation alarm devices (notification appliances) to operate continuously;
   b. The annunciator(s) to properly register;
   c. A signal to be transmitted over the DACT;
   d. Heating, ventilating, and air conditioning equipment over 2000 CFM to shut down;

   All operations shall remain in the alarm mode (except audible alarm notification appliances if manually silenced) until the system is manually restored to normal.

2. Supervisory Signal Initiation: Operation of a sprinkler control valve tamper switch shall not cause an alarm, but shall cause operation of common system audible trouble signal, and display of a visual indication distinct from that displayed to indicate a fire alarm or a fault in the supervisory circuit, and transmission of a distinct supervisory signal to the remote station.

3. Monitoring Integrity of Installation Conductors: All system circuits shall be electrically monitored for integrity including the following:

   a. Initiating circuits.
   b. Evacuation alarm (notification appliance) circuits (including both audible and visual notification appliances).
   c. Battery power supply (low and no voltage across the standby battery terminals and open battery circuit).

   Provide Class B initiating device circuits, and Class B notification appliance circuits as defined by NFPA72. A ground fault condition or single break in any other circuit shall cause operation of the system trouble signals. Loss of AC power, abnormal AC voltage, a break in the standby battery power circuit, or low battery voltage shall also cause operation of system trouble signals. The abnormal position of any switch in the control panel shall also cause operation of the system trouble signals. Audible and visual equipment for supervision of the AC power supply shall be

energized from the auxiliary DC power supply and vice versa. Trouble signals shall sound continuously until manually silenced or the system has been restored to normal. Electrical monitoring for integrity of wiring external of control panel for mechanical equipment shut down and magnetic door holding circuits is not required, provided a break in the circuit will cause doors to close and mechanical equipment to shutdown.

4. Walk-Test Mode: Provide system with walk-test mode to allow one person to test alarm and supervisory features of initiating devices. Walk-test mode shall be enabled from the control panel by authorized service personnel. Control panel shall display a unique visual indication when system is in walk-test mode. If testing ceases while in walk-test mode, after a preset delay system shall automatically return to normal standby mode.

5. Alarm Verification Feature: System shall have a smoke detector alarm verification feature. Upon activation of any area smoke detector, system shall institute an alarm verification process prior to enabling of the alarm functions as specified herein. Activation of any initiating device other than an area smoke detector shall cause immediate enabling of system into alarm mode. If an alarm input from a smoke detector on the initial zone in alarm is present at the end of an initial delay period not exceeding 20 seconds, all alarm functions as specified herein shall be immediately enabled. If a smoke detector alarm input is not present at the end of the initial delay period, a second-stage confirmation period of one minute shall be initiated. If a smoke detector alarm input is received during the second-stage confirmation period, all alarm functions shall be immediately enabled. During the verification process, activation of any area smoke detector on any zone other than the initial zone in alarm shall also cause system to go into alarm mode immediately. If no smoke detector alarm input occurs within the second-stage confirmation period, system shall reset to normal. Any alarm input received from an area smoke detector after the second-stage confirmation period has elapsed shall cause system to institute a new verification process.

B. Primary Power: Primary power source shall be 120 volts AC service, transformed through a two winding isolation type transformer and rectified to 24 volts DC for operation of all initiating device, notification appliance, signaling line, trouble signal and transmitter tripping circuits. The alarm current draw of the entire fire alarm system shall not exceed 80 percent of the rated output of the system power supply module(s). Obtain AC operating power as shown on contract drawings.

C. Auxiliary Power: Provide secondary DC power supply for operation of system in the event of failure of the AC source. Transfer from normal to emergency power or restoration from emergency to normal power shall be fully automatic and shall not cause transmission of a false alarm. Loss of AC power shall not prevent transmission of a signal to station fire alarm headquarters upon operation of any initiating circuit.

1. Storage Batteries: Provide sealed lead calcium or sealed lead acid batteries and charger. Drycell batteries are not acceptable. House batteries in the control panel or in a well constructed vented steel cabinet with cylinder lock, non-corrosive base, and louvered vents. Provide batteries of adequate ampere-hour rating to operate the system, including audible trouble signal devices, and transmitter tripping circuits under supervisory conditions for 24 hours, at the end of which time batteries shall be capable of operating the entire system in a full alarm condition for not less than five (5) minutes. Provide calculations substantiating the battery capacity. Provide reliable separation between cells to prevent contact between terminals of adjacent cells and between battery terminals and other metal parts. When a separate battery cabinet is used, provide a fuse block for battery leads within the cabinet. Finish the cabinet on the inside and outside with enamel paint. Locate the top of the batteries not more than 4 feet (4') above floor level.

2. Battery Charger: Provide completely automatic high/low charging rate type capable of

recovery of the batteries from full discharge to full charge in 24 hours or less. Provide a trouble light to indicate when batteries are manually placed on a high rate of charge as part of the unit assembly if a high-rate switch is provided. House charger in the control panel or battery cabinet.

2.2 COMPONENT DESIGN

A. Control Panel: Provide modular type panel installed in a surface mounted steel cabinet with hinged door and cylinder lock. Mount with panel centerline 5 feet above finished floor elevation. Switches and other controls shall not be accessible without the use of a key. The control panel shall be a neat, compact assembly containing all parts and equipment required to provide specified operating and supervisory functions of the system. Each control panel component shall be UL listed or FM approved and approved by the control panel manufacturer for use in the control panel. Panel cabinet shall be finished on the inside and outside with factory-applied enamel finish. Provide main annunciator located on the exterior of the cabinet door or visible through the cabinet door. Provide audible trouble signal. Provide permanent engraved rigid plastic or metal identification plates, or silk-screened labels attached to the rear face of the panel viewing window, for all lamps and switches. Provide a common system Form C dry alarm contact, and a common system Form C dry trouble contact. Permanently label all switches. Provide panel with the following switches:

1. Trouble silencing switch which silences audible trouble signals (including remote trouble devices, if provided) without extinguishing trouble indicating lamp(s). For non-self-resetting type switch, upon correction of the trouble condition, audible signals will again sound until the switch is returned to its normal position. For silencing switch of the momentary action, self-resetting type, the trouble signal circuit shall be automatically restored to normal upon correction of the trouble condition.
2. Evacuation alarm silencing switch which when activated will silence all alarm notification appliances without resetting the panel, and cause operation of system trouble signals. Subsequent alarm(s) from additional zone(s) not originally in alarm shall cause activation of the notification appliances even with the alarm silencing switch in the "silenced" position.
3. Reset switch which when activated will restore the system to normal standby status after the cause of the alarm has been corrected, and all activated initiating devices reset. Operation of reset switch shall restore activated smoke detectors to normal standby status.
4. Lamp test switch.
5. Drill switch which will enable test of notification appliances and restoration to normal without tripping the DACT.
6. HVAC shutdown bypass switch. Operation of the switch shall allow HVAC system to operate with detectors in alarm and shall cause operation of system trouble signals.

The control panel shall be equipped with system walk test features and shall include the following:

a. Voice Evacuation System: Upon activation, the Voice Evacuation System shall sound the temporal pattern signal for one minute followed by a prerecorded voice message. This evacuation signal shall sound continuously until such time as the manual station or automatic detector is restored to normal and the fire command station reset. To prevent premature aborting of the fire alarm signal, the system shall be designed so that no one can silence that signal before one (1) minute operation has elapsed.
b. Prerecorded message module shall contain a digitized message player. Power shall come on to the player when an alarm condition is detected or when transmission is commanded manually from the Voice Alarm System.

B. Main Annunciator: Provide integral with the control panel. Provide 80-character LCD display

located on the exterior of the cabinet door or visible through the cabinet door. The display shall provide specific identification of the device by means of a permanent label. In no case shall zone identification consist of the words "Zone 1," "Zone 2," etc., but shall consist of the description of the device.

1. Remote Annunciator Panel: Provide panel located as shown. Mount with panel centerline 5 feet above finished floor elevation. Panel shall duplicate all requirements specified for the control panel annunciator. Panel shall be of the interior type, flush-mounted. Provide panel with an integral audible trouble sounder which shall operate in conjunction with control panel audible sounder. Provide panel with trouble silence switch which shall comply with the requirements for a trouble silencing switch as specified in paragraph entitled "Control Panel".

C. Addressable Manual Pull Stations: Provide noncoded single action type with mechanical reset features. Stations shall be semi-flush mounted and interior type as indicated. Equip each station with a terminal strip with contacts of proper number and type to perform functions required. Stations shall be a type not subject to operation by jarring or vibration. Break-glass-front stations are not permitted; however, a pull-lever break-rod type is acceptable provided presence of rod is not required to reset station. Station color shall be red. Station shall provide visible indication of operation. Restoration shall require use of a key. Keys shall be identical throughout the system for all stations and control panel(s). Mount stations with operating lever at 4 feet above finished floor. Provide electronics for communicating with the fire alarm panel.

D. Addressable Heat Detectors: Provide detectors designed for detection of fire by combination fixed temperature rate-of-rise principle. Locate detectors in accordance with their listing by UL or FM and the requirements of NFPA 72. Mount detectors at the underside of ceiling or deck above unless otherwise indicated. Temperature rating of detectors shall be in accordance with NFPA 72. No detector shall be located closer than 12 inches to any part of any lighting fixture nor closer than 24 inches to any part of an air supply or return diffuser. Detectors, located in areas subject to moisture or exterior atmospheric conditions or hazardous locations as defined by NFPA 70, shall be types approved for such locations. Provide with terminal screw type connections. Removal of detector head from its base shall cause activation of system trouble signals if detectors are provided with separable heads and bases. Provide electronics for communicating with the fire alarm panel.

1. Combination Fixed Temperature Rate-Of-Rise Detectors (Spot Type): Designed for surface outlet box mounting and supported independently of conduit, tubing or wiring connections. Contacts shall be self-resetting after response to rate-of-rise actuation. Operation under fixed temperature actuation shall result in an external indication. Detector units located in boiler rooms, showers, or other areas subject to abnormal temperature changes shall operate on fixed temperature principle only.

E. Open-Area (Spot-Type) Smoke Detectors: Provide detectors designed for detection of abnormal smoke densities by the photoelectric principle. Provide necessary control and power modules required for operation integral with the control panel. Detectors and associated modules shall be compatible with the control panel and shall be suitable for use in a supervised circuit. Malfunction of the electrical circuits to the detector or its control or power units shall result in the operation of the system trouble signals. Each detector shall contain a visible indicator lamp that shall flash when the detector is in the normal standby mode and shall glow continuously when the detector is activated. Each detector shall be the plug-in type with tab-lock or twist-lock, quick disconnect head and separate base in which the detector base contains screw terminals for making all wiring connections. Detector head shall be removable from its base without disconnecting any wires. Removal of detector head from its base shall cause activation of system trouble signals. Each detector shall be screened to prevent the entrance of insects into the detection chamber(s). Provide electronics for communicating with the fire alarm panel.

1. Photoelectric Detectors: Operate on the light scattering principle using a LED light source. Detector shall respond to both flaming and smoldering fires.

2. Detector Spacing and Location: Detector spacing and location shall be in accordance with the manufacturer's recommendations and the requirements of NFPA 72. Detectors shall not be placed closer than 3 feet from any air discharge or return grille, nor closer than 12 inches to any part of any lighting fixture. In areas without finished ceilings, mount detectors at the underside of deck above unless otherwise indicated.

F. Notification Appliances: Provide in accordance with NFPA 72 and as indicated. Do not exceed 80 percent of the listed rating in amperes of any notification appliance circuit. Additional circuits above those shown shall be provided if required to meet this requirement. Submit calculations showing compliance with the above power consumption requirements with the calculations required by the paragraph titled "Design Data". Effective sound levels shall comply with NFPA 72. Provide appliances in addition to those shown if required in order to meet NFPA 72 sound level requirements. Finish appliances in red enamel.

1. Alarm Speakers: Recessed, grill, vibrating type suitable for use in an electrically supervised circuit and shall have a sound output rating of at least 90 decibels at 10 feet.

2. Visible Appliances: Flush-mounted assembly of the stroboscopic type suitable for use in an electrically supervised circuit and powered from the notification appliance circuit(s). Appliances shall provide a minimum of 15candela measured in accordance with UL 1971, but in no case less than the effective intensity required by NFPA 72 for the appliance spacing and location shown. Lamps shall be protected by a thermoplastic lens and labeled "FIRE" in letters at least 1/2 inch high. Provide visible appliances within 12 inches of each audible appliance and as indicated. Visible appliances may be part of an audio-visual assembly. Where more than two appliances are located in the same room or corridor, provide synchronized operation. Mount units at 80" A.F.F. to bottom of device.

G. Communicating Devices

1. Monitor Modules: Monitor modules shall be individually addressable modules. Modules shall be capable of monitoring a dry contact from an external source such as flow switch, tamper switch, or hood extinguishing system and communicating a change in status of that contact to the control panel. Modules shall be capable of monitoring the status of that contact to the control panel. Modules shall be capable of monitoring the status of the wiring between the module and the monitored contact. An open condition on this wiring shall be reported as a trouble condition.

2. Control Modules: Control modules shall be individually addressable modules. Modules shall provide dry contact outputs to external devices such as door holders or motor starters to produce an effect as commanded by the control panel.

H. Fire Alarm Cellular Communicator: A cellular communicator that responds to the actuation of the fire alarm control panel shall be provided. The communicator shall be a UL 864-listed device capable of transmitting alarm, supervisory, and trouble signals via 5G LTE-M or latest cellular technology to a UL-listed central monitoring station. It shall support dual-SIM functionality for redundancy across multiple carriers (e.g., AT&T, Verizon) and include a backup battery providing minimum 24-hour standby power. The communicator shall comply with all aspects of NFPA 72 and UL 864, ensuring supervision intervals not exceeding 60 minutes and secure signal transmission with AES 256-bit encryption or equivalent.

I. Conduit

1. Rigid Steel Conduit (Zinc-Coated): ANSI C80.1 or UL 6.

2. Intermediate Metal Conduit (IMC): UL 1242, zinc-coated steel only.

3. Electrical Metallic Tubing (EMT): ANSI C80.3 or UL 797.

J. Outlet Boxes: UL 514A, zinc-coated steel.

K. Fittings for Conduit and Outlet Boxes: UL 514B, zinc-coated steel.

L. Wiring: NFPA 70 and NFPA 72. Wire for 120V circuits shall be No. 12 AWG minimum solid copper conductor. Insulation shall be 75 degree C minimum with nylon jacket.

2.3 SURGE SUPPRESSION

Provide line voltage and low voltage surge suppression devices to suppress all voltage transients which might damage the control panel and transmitter components. Mount suppressors in separate enclosure(s) adjacent to control panel and transmitter unless suppressors are specifically UL listed or FM approved for mounting inside the control panel and transmitter provided and approved for such use by the control panel and transmitter manufacturers.

A. Line Voltage Surge Suppressor: Suppressor shall be UL 1449 listed with a maximum 330 volt clamping level and a maximum response time of 5 nanoseconds. Suppressor shall also meet IEEE C62.41 category B tests for surge capacity. Suppressor shall be a multi-stage construction which includes inductors and silicon avalanche Zener diodes. Suppressor shall have a long-life indicating lamp (light emitting diode or neon lamp) which extinguishes upon failure of protection components. Fuses shall be externally accessible. Wire in series with the incoming power source to the protected equipment using screw terminations.

B. Low Voltage Surge Suppressor: Provide for all circuits which leave the building shell and as shown on the contract drawings. When circuits interconnect two or more buildings, provide an arrestor at the circuit entrance to each building. Suppressor shall be UL 497B listed with a maximum 30 volt clamping level and a maximum response time of 5 nanoseconds. Suppressor shall have multi-stage construction and both differential/common mode protection.

PART 3 - EXECUTION

3.1 INSTALLATION

Installation shall be in accordance with the requirements of NFPA 70, NFPA 72 and the Office of the State Fire Marshal. Each conductor used for the same specific function shall be distinctively color coded. Each function color code shall remain consistent throughout the system. All circuit conductors shall be identified within each enclosure where a tap, splice or termination is made. Conductor identification shall be by plastic coated self sticking printed markers or by heat-shrink type sleeves. The markers shall be attached in a manner that will not permit accidental detachment. Control circuit terminations shall be properly identified. Wire devices so that their removal will activate system trouble signals. Wiring for DC circuits shall not be permitted in the same conduit or tubing as wiring for AC circuits. Paint all junction box covers red or provide them with permanent labels reading "FIRE ALARM CIRCUIT." Electrical metallic tubing shall not be installed in exterior or wet locations and shall not be imbedded in masonry or concrete.

3.2 FIELD QUALITY CONTROL

A. Preliminary Testing: Notify Design Professional prior to performing preliminary testing. Contractor shall conduct the following tests during installation of wiring and system components. Any deficiency pertaining to these requirements shall be corrected by the Contractor prior to final acceptance testing of the system. Record results of testing.

    1. Ground Resistance: Prior to connecting control panel and transmitter, test grounds for ground resistance value. Use a portable ground testing megger to test each ground or group of grounds. Make ground resistance measurements in normally dry weather, not less than 48 hours after a rainfall. Follow the directions provided by the equipment manufacturer for proper use of the equipment. Measure resistance of each connection to ground. Resistance of each connection to ground shall not exceed 5 ohms.
    2. Operation of Entire System. Operate all initiating and indicating devices.
    3. Operation of Supervisory Systems: Operate all portions to demonstrate correctness of installation.
    4. Smoke Detector Test: Clean the smoke detectors in accordance with the manufacturer's recommended procedures. Test smoke detectors using magnet-activated test switch, manufacturer-provided test card, or smoke. Use of aerosol sprays to test smoke detectors is prohibited.

B. Final Acceptance Testing: The Contractor shall notify the Design Professional when the system is ready for final acceptance testing. Request scheduling for final acceptance testing only after all necessary preliminary tests have been made and all deficiencies found have been corrected to the satisfaction of the equipment manufacturer's technical representative and the Design Professional, and written certification to this effect has been received by the Design Professional. The Contractor shall furnish all appliances, equipment, instruments, devices and personnel for this test. The system shall be tested for approval in the presence of representatives of the manufacturer, and the Design Professional. All necessary tests shall be made including the following, and any deficiency found shall be corrected and the system retested.

    1. Entire System: Test the entire system by operating all fire alarm initiating, notification, and signaling devices. Perform tests with the system operating on primary power and repeat the test with the system operating on battery power only. Provide necessary equipment to test smoke detectors and heat detectors.

    2. Supervisory Systems: All aspects of the supervisory functions of the systems shall be operated. Verify proper trouble annunciation at the control panel.

C. Additional Tests: When deficiencies, defects or malfunctions develop during the tests required, all further testing of the system shall be suspended until proper adjustments, corrections or revisions have been made to assure proper performance of the system. If these revisions require more than a nominal delay, the Design Professional shall be notified when the additional work has been completed, to arrange a new inspection and test of the fire alarm system. All tests required shall be repeated prior to final acceptance, unless directed otherwise.

END OF SECTION 28 31 00

DIVISION 31
EARTHWORK

None in this Project Manual

DIVISION 32
EXTERIOR IMPROVEMENTS

None in this Project Manual

DIVISION 33
UTILITIES

None in this Project Manual