Project Manual

LSU Solicitation Number RFQ-0000002778

Furnish Labor and Materials for

Renovations to Oakland Hall
Louisiana State University at Alexandria

8100 Hwy 71 S
Alexandria, LA 71302

April 2026

Ashe Broussard Weinzettle Architects, LLP
(Architect's Project Number 2026.04)

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26 27 13	Electrical Distribution System	6 pages
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26 51 00	Lighting Fixtures	4 pages

DIVISION 27 –COMMUNICATIONS **none included**

27 10 00	Building Telecommunications Cabling System	9 pages

DIVISION 28 – ELECTRONIC SAFETY & SECURITY
28 05 13 Telephone/Data/CATV Communication System 14 pages

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DIVISION 32 – EXTERIOR IMPROVEMENTS none included

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, May 28, 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 Oakland Hall LSUA**

LSU SOLICITATION NUMBER: RFQ-0000002778

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 11, 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: April 24, May 1, May 8, 2026

LOUISIANA UNIFORM PUBLIC WORK BID FORM

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

BID FOR: Furnish Labor and Materials for Renovations to Oakland Hall
Louisiana State University at Alexandria
RFQ-0000002778

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 add replacement of windows mark D and all millwork cabinets/associated plumbing fixtures, for the lump sum of:

_____Dollars ($ _____)

Additive Alternate No. 2 Provide all labor, materials to add EIFS over existing siding, decorative grooves in EIFS, prefinished wood cladding in certain locations, for the lump sum of:

_____Dollars ($ _____)

Additive Alternate No. 3 Provide all labor, materials to add replacement railing, replace section of exterior wall, replace plumbing fixtures, for the lump sum of:

_____Dollars ($_____)

NAME OF BIDDER: _____

ADDRESS OF BIDDER: _____

_____

LOUISIANA CONTRACTOR'S LICENSE NUMBER: _____

NAME OF AUTHORIZED SIGNATORY OF BIDDER: _____

TITLE OF AUTHORIZED SIGNATORY OF BIDDER: _____

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER **: _____

DATE: _____

THE FOLLOWING ITEMS ARE TO BE INCLUDED WITH THE SUBMISSION OF THIS LOUISIANA UNIFORM PUBLIC WORK BID FORM:

* The Unit Price Form shall be used if the contract includes unit prices. Otherwise it is not required and need not be included with the form. The number of unit prices that may be included is not limited and additional sheets may be included if needed.

** **A CORPORATE RESOLUTION OR WRITTEN EVIDENCE** of the authority of the person signing the bid for the public work as prescribed by LA R.S. 38:2212(B)(5).

BID SECURITY in the form of a bid bond, certified check or cashier's check as prescribed by LA R.S. 38:2218(A) attached to and made a part of this bid.

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 Oakland Hall, Louisiana State University at Alexandria, , ALEXANDRIA, LOUISIANA**, complete and in accordance with all requirements of the Contract Documents.

1.2 PROJECT DESCRIPTION

A. SUMMARY:

1. Renovations to a free-standing, two-story, university building containing classrooms, offices, and support spaces.

2. Building structure is a combination of concrete lift slab & concrete columns.

3. Existing exterior finishes are painted wood T1-11 siding in a modular wood frame and inset panel system on the existing walls to remain.

4. New walls to receive a typical pattern of cladding: primarily EIFS with sections of prefinished wood cladding next to existing building columns. See ELEVATIONS and ALTERNATES.

5. Interior finishes are painted gypsum board, LVT/carpet tile flooring, and suspended acoustic ceiling.

6. Existing roofing is membrane on concrete deck. Roof structure is low-sloped. Re-roofing work is a separate project.

7. Lighting is primarily existing to remain with some new lay-in LED.

8. HVAC is nearly full replacement: primarily DX split system, using existing boiler and existing chilled water loop.

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 make reasonable efforts to finish the project completely or in phases by the start of Fall semester 2026.

F. Contractor shall visit site to become aware of numerous existing exposed conduit and surface mounted fixtures. Contractor shall remove and reinstall these fixtures as required and shall install new construction neatly and completely around existing conduits to remain.

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 Oakland Hall, Louisiana State University at Alexandria, 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 ADDITIVE ALTERNATES

A. Additive Alternate Number One (1)
Provide all labor and materials to add the following:
1. Replace all existing jalousie windows with new window mark D.
2. All millwork cabinets and associated plumbing fixtures. Base Bid contains all rough-in utilities at these millwork locations.

B. Additive Alternate Number Two (2)
Provide all labor and materials to add the following:
1. In certain limited areas, install new EIFS system over existing TI-11 siding and inset panels where indicated on the Drawings.
2. Decorative grooves in EIFS.
3. Wood cladding and trim at certain locations on exterior walls as per ELEVATIONS. Base Bid contains EIFS finish in those locations.

C. Additive Alternate Number Three (3)
Provide all labor and materials to add the following:
1. Replace existing balcony railing with new railing, as per Drawings.
2. Replace existing section of exterior wall at CONFERENCE/BREAKROOM 111 with new wall system, as per DRAWINGS.
3. Replace existing plumbing fixtures as per MECHANICAL.

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.

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 OAKLAND HALL
LOUISIANA STATE UNIVERSITY AT ALEXANDRIA
Alexandria, Louisiana 71302
(Architect's Project Number: 2026.04)

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 OAKLAND HALL
LOUISIANA STATE UNIVERSITY AT ALEXANDRIA
Alexandria, Louisiana 71302
(Architect's Project Number: 2026.04)

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 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/storefront framing: Installed in structural frame including flashing, shims, etc.
   b. EIFS panel including decorative grooves
   c. Wood cladding panel, including trim.

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.

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

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.

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. Glass: Clean inside and outside.
3. Aluminum frames: Clean all aluminum frame surfaces of all dirt, grime, excess caulk sealant, carpet glue, etc.
4. 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 15 00	Dampproofing
07 21 00	Thermal Insulation
07 27 26	Fluid Applied Membrane Air Barrier
07 40 00	Exterior Wall Insulation System
07 52 16	SBS Modified Bituminous Membrane Roofing
07 60 00	Flashing and Sheet Metal
07 84 00	Firestopping
07 90 00	Sealants
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SECTION 07 15 00

DAMPPROOFING

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: Work of this Section includes dampproofing systems, complete. In general, dampproofing includes dampproof courses at base flashing of masonry walls, under window sills, above windows and doors, and at other locations shown.

PART 2 PRODUCTS

2.1 DAMPPROOFING

A. Metal flashings: 5 ounce copper laminated to heavy duty Kraft paper with high melting point asphalt; tri-directional glass reinforcing fibers embedded in asphalt.

B. Mastic: Federal Specification SS-C-153, Type 1 or ASTM D-2822-75, Type 1 Flashing Cement.

C. Flexible Flashings - .040" synthetic rubber membrane, 12" wide minimum "Pre-Kleened EPDM" by Carlisle, "FLASHGARD" by Firestone or equal. (Contractor may use this material, or equal, at his option at all thru wall flashings so long as stainless steel flashing edge extends past weep holes.)

D. Stainless steel edge flashing shall be 3" deep, front to back.

PART 3 EXECUTION

3.1 DAMPPROOFING

A. Apply one coat flashing cement. Insert dampproofing strips lapping 4" at joints with flashing cement between laps. Turn up backing courses as detailed, min. 8" behind sheathing.

B. Extend metal flashing edge 1/2" past exterior wall face, turn down, and make a hemmed edge. Turn up inside as detailed to run behind sheathing. Make end dams at window sills.

C. Take all necessary measures to insure water is prevented from entering the wall assembly and is directed to the exterior.

END OF SECTION

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 2 x 4 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 5 ½" at 2 x 6" stud walls and to 7” at 2 x 8 stud walls.

2. Wall Insulation/Rigid: At exterior CMU walls, provide rigid polyisocyanurate insulation, foil-faced, ¾” thickness, cut to fit between furring strips as per Drawings.

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 40 00

EXTERIOR WALL INSULATION SYSTEM

PART 1 GENERAL

A. The general conditions, supplementary conditions and general requirements of these construction documents apply to the general contractor subcontractors, material suppliers and all other persons furnishing labor and materials under this Section.

1.1 DESCRIPTION

A. Furnish all materials and labor for a complete installation of the exterior insulation and finish system (EIFS) wall system as shown on Drawings and as specified herein. System shall be "rainscreen" drainage type.

1.2 SUBMITTALS

A. Submit copies of manufacturer's specifications and installation instructions and details, for review by Architect.
B. Samples – provide 8" x 8" typical manufacturer samples of colors and textures for selection by Designer.

PART 2 PRODUCTS

2.1 MATERIAL - GENERAL

A. Manufacturers: Materials are specified by brand names to establish a standard quality, or by performance requirements and general description of product. The Architect will consider substitutions for brand names of products specified provided the procedures set forth for substitutions are followed. The Architect reserves the right to reject any materials which, in his opinion, will not produce the quality of work specified herein.

B. The following are acceptable manufacturers:

1. STO Industries, Inc, StoTherm ci. (see accompanying data sheet)
2. Dryvit Systems, Inc., Outsulation Plus MD (see accompanying data sheet)
3. Approved equal.

2.2 ADHESIVE

A. One component, polymer-modified, cement based adhesive.

2.3 INSULATION BOARD

A. Expanded Polystyrene (EPS Board) less than 25 flame spread, 1.0 lbs/per BU. FT., average density; U=0.26 per inch; Federal Specifications HH-1-524C, Type 1 Class A.

B. Board must by manufactured and packaged by a manufacturer Approved and licensed EPS Molder. Each board must be marked on the end with a manufacturer identification mark and boards packaged with proper identification information.

C. Provide thickness as indicated on Drawings.

2.4 GROUND COAT - RFP

A. RFP - a ready mixed, non-cementicious, 100% acrylic co-polymer emulsion based, water resistant, vapor permeable, glass fiber reinforced non capillary action ground coat. RFP shall be tinted to the same shade as the finish.

B. Where indicated on plans and details provide additional coat, to be a copolymer-based waterproofer, adhesive and ground coat. Apply as per manufacturer's full recommendations for installation and specfic intended use as indicated on Drawings.

2.5 FABRIC

A. Fabric shall be reinforced fiber mesh with symmetrical interlaced glass fiber made from twisted multi-end strands, styrene butadiene coated at least 20 grams per square yard to provide a shiftproof and alkaline resistant mesh compatible with finish material.

B. Corner mat 4/5 heavy duty woven fiberglass mat pre-bent for maximum impact protection of corners, and to insure sharp corners.

2.6 FINISH

A. The finish shall be one of manufacturer's exterior ready mixed acrylic based wall coatings. Type, texture, color and aggregate size shall be selected by.

B. Color selection: Color is to be selected by Designer, approved by User Agency, from manufacturer standard colors.

PART 3 EXECUTION

3.1 INSTALLATION

A. All installations of materials shall be performed by and/or supervised by manufacturer Certified Applicators, according to the manufacturer's recommendations.

END OF SECTION

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.

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. Hot Roofing Asphalt: Roofing asphalt heated to temperature recommended by roofing manufacturer to flux modified roofing membrane, measured at the mop cart or mechanical spreader immediately before application.

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 STAIN GRADE, RED OAK 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 Kawneer Permadize (50% PVDF), AAMA, color to be selected by Architect from manufacturer's standard colors. Match finish color of existing storefront.

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 AND STOREFRONT

A. Exterior aluminum storefront located as per the Drawings at exterior window openings shall be equal to 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.

B. Aluminum storefront entrance doors to be equal to Kawneer Standard Entrance 350 medium stile. 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 .

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. YA - ASSA ABLOY ACCENTRA
4. RO - Rockwood
5. OT - Other

Hardware Sets based on plans dated May 2026
***Keying to be field verified prior to purchase of hardware.**

Set: 1.0
Doors: 104 A, 104 B, 204 A, 204 B, 213 A, 213 B
Description: Sgl Alum - Classroom Lock - Closer

1	Continuous Hinge	CFM__SLF-HD1		PE
1	Classroom Lock	PB 5408LN - Match Keying	626	YA
1	Drop Plate	488	689	YA

1	Closer	4400 SNB	689	YA
1	Perimeter Seal	By door mfgr		OT

Set: 2.0
Doors: 232, 235
Description: Sgl Alum - Office Lock - Closer

1	Continuous Hinge	CFM__SLF-HD1		PE
1	Entry Lock	PB 5407LN - Match Keying	626	YA
1	Drop Plate	488	689	YA
1	Closer	4400 SNB	689	YA
1	Perimeter Seal	By door mfgr		OT

Set: 3.0
Doors: 219
Description: Storeroom - Closer

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
3	Silencer	608-RKW		RO

Set: 4.0
Doors: 109, 123, 216, 238, 239
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: 100, 101, 102, 103, 105, 106, 107, 108, 200, 201, 202, 203, 205, 206, 207, 208, 209, 210, 211, 212, 214, 215, 222, 223, 226, 227, 230, 231, 233 A, 233 B, 234, 236
Description: Office

3	Hinge, Full Mortise	TA2714	US26D	MK
1	Entry Lock	PB 5407LN - Match Keying	626	YA
1	Door Stop	480	US32D	RO
3	Silencer	608-RKW		RO

Set: 6.0
Doors: 224, 228, 237
Description: Classroom Function - Closer

3	Hinge, Full Mortise	TA2714	US26D	MK

1	Classroom Lock	PB 5408LN - Match Keying	626	YA
1	Closer w/ Hold Open	4410 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: 7.0
Doors: 217, 218
Description: Privacy - Closer - Gasket

3	Hinge, Full Mortise	TA2714	US26D	MK
1	Privacy Lock	PB 5402LN	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: 8.0
Doors: 110, 111 A, 111 B, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 220A, 220B, 221, 225, 229
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 30 00	Ceramic Tile
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 30 00

CERAMIC TILE

PART 1 GENERAL

1.1 DESCRIPTION

A. Work included: Provide ceramic tile 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.

C. One (1) box of each type of tile to be left at job site as surplus material.

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. Provide manufacturer's Master Grade Certificate stating type and location of each tile material in this Section.

1.3 REFERENCES

A. American National Standards Institute:
1. ANSI A108.1 - Installation of Ceramic Tile, A collection.
2. ANSI A108.1A - Specifications for Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar.
3. ANSI A108.1B - Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar.
4. ANSI A108.1C - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar -or- Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar.
5. ANSI A108.5 - Specifications for Ceramic Tile Installed with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar.
6. ANSI A108.6 - Specifications for Ceramic Tile Installed with Chemical-Resistant, Water-Cleanable Tile-Setting and -Grouting Epoxy.
7. ANSI A108.7 - Specifications for Electrically Conductive Ceramic Tile Installed with Conductive Dry-Set Portland Cement Mortar.
8. ANSI A108.9 - Specifications for Ceramic Tile Installed with Modified Epoxy Emulsion Mortar/Grout.
9. ANSI A108.10 - Specifications for Installation of Grout in Tilework.
10. ANSI A118.1 - Standard Specification for Dry-Set Portland Cement Mortar.
11. ANSI A118.3 - Chemical-Resistant, Water-Cleanable, Tile-Setting and -Grouting Epoxy and Water-Cleanable Tile-Setting Epoxy Adhesive.
12. ANSI A118.4 - Latex-Portland Cement Mortar.
13. ANSI A118.6 - Ceramic Tile Grouts.
14. ANSI A118.8 - Modified Epoxy Emulsion Mortar/Grout.
15. ANSI A118.9 - Test Methods and Specifications for Cementitious Backer Units.
16. ANSI A137.1 - Ceramic Tile.

B. Tile Council of America:
   1. TCA - Handbook for Ceramic Tile Installation.

1.3 SUBMITTALS

A. Comply with pertinent provisions of Section 01340.

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. Samples of each type, class and color of ceramic tile required, not less than 12" square, mounted on plywood or hardboard backing and grouted as specified.

C. Except when specifically exempted by the Architect, submit Master Grade Certificates for each shipment of ceramic tile prior to arrival of the shipment at the job site.

1.,4 PRODUCT HANDLING

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

PART 2 PRODUCTS

2.1 CERAMIC TILE

A. Ceramic Tile: All to be of same manufacturer and series.

Floor Tile:
1. Provide coefficient of friction not less than 0.50 when tested in accordance with ASTM F489, ASTM F609 and the National Bureau of Standards Technical Note 895.
2. American Olean, Neospeck
3. Provide standard accessories and trim, as typical with this line of tile.
4. Tile shall comply with all requirements as per the “Americans with Disabilities Act” (ADA).

Base:
1. Ceramic base shall be American Olean, or equal, part of wall tile.

Wall Tile:
1. American Olean, Neo concrete.

2.2 SETTING METHODS

A. Comply with pertinent recommendations contained in the Tile Council of American "Handbook for Ceramic Tile Installation".

B. Methods and materials:
   1. Provide thin set method at all floor conditions, as per Tile Council of American, Inc., Specification Number F-115-88.
   2. Provide thin set method at all wall conditions, Tile Council of American, Inc., Specification Number W243-88.
   3. Upon completion of placing and grouting, clean the work of this Section in accordance with the recommendations of the manufacturers of the materials used.
   4. Protect metal surfaces, cast iron and vitreous items from effects of acid cleaning.
   5. Flush surfaces with clean water before and after cleaning.

6. Provide tile surfaces clean and free from cracked, broken, chipped, unbonded and otherwise defective units.
7. Provide required protection of tile surfaces until completion of project.

2.3 GROUT

A. Comply with pertinent sections and recommendations in the Tile Council Handbook in colors selected by Architect, acid resistant grout Durament, Hydrament or approved equal.

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.

B. Furnish and install sections of low profile ADA-accessible 4" deep marble thresholds full width of doorways. Color to be selected by 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. Comply with ANSI A108.5, ANSI A108.10, and the "Handbook for Ceramic Tile Installation" of the Tile Council of America, except as otherwise directed by the Architect or specified herein.
2. Maintain minimum temperature limits and installation practices recommended by materials manufacturers.
3. Do not install tile floors over membrane until the membrane has been tested and accepted.

B. Limits of tile:
1. Extend tile into recesses and under equipment and fixtures to form a complete covering without interruptions.
2. Terminate tile neatly at obstructions, edges and corners, without disruption of pattern or joint alignment.

C. Joining pattern:
1. Lay tile in grid pattern unless otherwise indicated on the Drawings or directed by the Architect.
2. Align joints when adjoining tiles on floor, base, trim and walls are the same size.
3. Layout tile work, and center the tile fields both directions in each space or on each wall area.
4. Adjust to minimize tile cutting.
5. Provide uniform joint widths.

D. Provide expansion and control joints where shown on the Drawings, and where otherwise recommended by the "Handbook for Ceramic Tile Installation" of the Tile Council of America, sealing in accordance with Section 07920 of these Specifications.

E. Cleaning:
1. Upon completion of placing and grouting, clean the work of this Section in accordance with recommendations of the manufacturers of the materials used.
2. Protect metal surfaces, cast iron and vitreous items from effects of acid cleaning.
3. Flush surfaces with clean water before and after cleaning.

F. Provide tile surfaces clean and free from cracked, broken, chipped, unbonded and otherwise defective units.

G. Provide required protection of tile surfaces to prevent damage and wear prior to acceptance of the Work by the Owner.

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.

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”.

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 28 13	Toilet Accessories
10 42 10	Dimensional Letters
10 44 00	Portable Fire Extinguishers
10 44 10	Interior Room Signs
10 80 00	Specialties

SECTION 10 28 13

TOILET ACCESSORIES

PART 1 GENERAL

1.1 DESCRIPTION

A. Work in this Section includes toilet and bath accessories complete.

B. Surface mounted accessories mounted on concealed back plates. Accessories shall have concealed fastenings.

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 APPROVED MANUFACTURERS

A. Approved accessories are those equal to those manufactured by Bradley, Miami-Carey, Bobrick, Hall-mack, Ketcham, American Standard, Whitehall Mfg., and Fort Howard Paper Company.

2.2 SCHEDULE OF ACCESSORIES: Model numbers listed refer to Bobrick.

A. At Restrooms provide each with quantities as indicated on Drawings and as required:
B-6806 x 36 grab bar
B-6806 x 42 grab bar
B-165 1836 mirror
B-282 coat hook
Paper towel holder, provided by others, installed by GC.
Toilet tissue holder, provided by others, installed by GC.
Soap dispenser, provided by others, installed by GC.

PART 3 EXECUTION

3.1 INSTALLATION

A. Locate accessories as directed. Securely install at height as per ADA-AG and directed. Rigidly anchor and leave clean and in unmarred condition.

B. Follow directions of manufacturer for accessory installation for concealed mounting. Use manufacturer's mounting kits.

C. Verify all mounting heights. Where accessible accessories are called out verify exact required height prior to installation.

END OF SECTION

SECTION 10 42 10
DIMENSIONAL LETTERS

1 GENERAL

1.1 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. Exterior and Interior dimensional letters of light weight fabricated metal construction.

1.2 QUALITY ASSURANCE

A. Supplier: 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.

1.3 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.
D. Sign Schedule: Submit signage schedule for complete project, listing sizes, locations and layout of signage types, sign text copy, and graphics.
E. Samples: for initial selection: Submit supplier's standard color chart for selection purposes and selected colors for verification purposes.
F. Samples for verification: For each type of sign, include the following samples to verify color and finish selected:
   1.Full size sample of letter style and size required to show finish, texture and mounting method.
G. Installation: Submit supplier's installation instructions.
H. Closeout Submittals:
   a. Submit operation and maintenance data for installed products, including precautions against harmful cleaning materials and methods.
   b. Submit warranty documents specified herein.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Division 1.
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.

D. Store products protected from weather, temperature, and other harmful conditions as recommended by supplier.

1. Handle products in accordance with manufacturer's instructions.

1.5 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.

C. Warranty Period: One year from product ship date. Warranty specifically excludes letter mounting substrate.

2 PRODUCTS

2.1 SIGNAGE SYSTEMS

A. Acceptable Manufacturers:

1. ASI Signage Innovations, 520 Commerce Point Harahan, LA 70123; (504) 704 1000 telephone; (504) 704 1006 facsimile. Contact: Ercelle Anthony (225) 229-5984.
2. APCO, http://www.apcosigns.com
3. Kroy Sign Systems, http://www.kroysignsystems.com/home.html
4. Takeform, contact: **Hilary Hoot** | Account Manager
   hgh@takeform.net 585.735.7433 direct
   takeform
   11601 Maple Ridge Road, Medina NY 14103
   P 800.528.1398 | F 585.798.8889
   www.takeform.net

B. Acceptable Product: ASI LF Series , Light Weight Fabricated Metal Dimensional Letters, Exterior, or Takeform, Ethos, Signify.

1. Height: 10"
2. Depth: 1/2" – 1"
3. Letter style: To be selected by Architect.

a. Stud mounted to exterior building wall. (see Drawings)

4. Letters (TBD, for bidding purposes use the following):

a. SCHOOL OF EDUCATION
b. DISTANCE LEARNING
c. OFFICES

2.2 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.

3 EXECUTION

3.1 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 it's representative implies that substrate and conditions are prepared and ready for product installation. Proceeding with installation implies installer's acceptance of substrate and conditions.

3.2 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:

F. Interior Signs: Within 1/4 inch vertically and horizontally of intended location.

G. Exterior Signs: Within 1 inch vertically and horizontally of intended location.

3.3 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 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.

3.4 SIGN SCHEDULE

A. Schedule: Refer to signage schedule and Drawings for sizes, locations and layout of signage types, sign text copy, and graphics.

END OF SECTION

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. Accessible Restroom Signage
2. 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 I- 8.85" x 8.74" Restrooms entrances.
    b. Sign Type II – 4" x 6" EXIT, mounted for "low level" as per Code.
    c. Sign Type III – 4" x 8.74" Auxiliary Room doors.
    d. 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 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, 30" x 36", aluminum cover and frame,
B. Approved equal: Babcock-Davis or by
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.

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	BASIC MECHANICAL MATERIALS AND METHODS FOR PLUMBING AND HVAC
22 02 00	MOTORS FOR PLUMBING AND HVAC
22 05 00	HANGERS AND SUPPORTS FOR PLUMBING AND HVAC
22 05 53	MECHANICAL IDENTIFICATION FOR PLUMBING AND HVAC PIPING
22 07 19	PIPE INSULATION FOR PLUMBING AND HVAC
22 11 16	DOMESTIC WATER PIPING SYSTEMS
22 13 16	SOIL, WASTE, & VENT PIPING
22 42 13	PLUMBING FIXTURES

SECTION 22 01 00

BASIC MECHANICAL MATERIALS AND METHODS FOR PLUMBING AND HVAC

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:

1. Piping materials and installation instructions common to most piping systems
2. Dielectric fittings
3. Flexible connectors
4. Sleeves
5. Escutcheons
6. Grout
7. Mechanical demolition
8. Equipment installation requirements common to equipment sections
9. Painting and finishing
10. Concrete bases
11. Supports and anchorages
12. Access panels

1.3 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "Provide": Except as otherwise defined in greater detail, the term "provide" means furnish and install, complete in every respect and ready for the intended use, as applicable in each instance.

I. "Inspect": The term "inspect" or "inspection: when used to describe observation of the Contractor's Work by the Engineer shall mean an endeavor to guard the Owner against defects and deficiencies in the Work and to determine, in general, if the Work is being performed in a manner such that, when completed, it will be in accordance with the Contract Documents.

J. Wiring: the term "wiring" shall include providing raceway, conductors, and cable in accordance with the requirements of Division 26.

K. The following are industry abbreviations for plastic materials:

1. ABS: Acrylonitrile-butadiene-styrene plastic.
2. PVC: Polyvinyl chloride plastic.

L. The following are industry abbreviations for rubber materials:

1. EPDM: Ethylene-propylene-diene terpolymer rubber.
2. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

A. Product Data: For the following:

1. Dielectric fittings.
2. Escutcheons.

B. Shop Drawings: Detail fabrication and installation for metal supports and anchorage for mechanical materials and equipment.

1.5 QUALITY ASSURANCE

A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code–Steel."

B. Equipment Selection: Equipment of higher electrical characteristics, capacities, and ratings may be furnished provided such proposed equipment is approved in writing and connecting mechanical and electrical services, circuit breakers, conduit, motors, bases, and equipment spaces are appropriately modified. The Contractor will be responsible for any added costs for such modifications. If minimum energy ratings or efficiencies of equipment are specified, equipment must meet design and commissioning requirements.

C. Drawings: The Mechanical Drawings show the general arrangement of piping, equipment, and appurtenances, and shall be followed as closely as actual building construction and the work of other trades will permit. The Mechanical work shall conform to the requirements shown on all the Drawings. Because of the small scale of the Mechanical Drawings, it is not possible to indicate all offsets, fittings, and accessories which may be required. The Contractor shall investigate the structural and finish conditions and other building components affecting the work and shall arrange his work accordingly, providing such offsets, fittings, and accessories as may be required to meet such conditions. No extras will be approved for required additional offsets and fittings. Any offsets or additional fittings required to coordinate mechanical systems with existing conditions and other trades, or that are necessary for the complete installation of the system, including modifications to shop or off-site fabricated piping and/or ductwork, all shall be provided by the Contractor at no additional cost to the Owner.

D. Codes and Standards: comply with the following codes. Comply with the latest edition except where indicated otherwise or a specific edition is required by the authority having jurisdiction:

1. International Building Code
2. International Mechanical Code
3. International Plumbing Code with Louisiana Amendments
4. Louisiana State Energy Code
5. NFPA 70, 72, 90A, 90B, and 101
6. All applicable local codes

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and prevent entrance of dirt, debris, and moisture.

B. Protect stored pipes and tubes from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor, if stored inside.

C. Protect flanges, fittings, and piping specialties from moisture and dirt.

1.7 COORDINATION

A. Coordinate mechanical equipment installation with other building components and existing conditions.

B. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction to allow for mechanical installations.

C. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components, as they are constructed.

D. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning before closing in building.

E. Coordinate connection of mechanical systems with exterior underground utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Costs for all utility connections shall be the Contractor's responsibility, including any connections made by the utility company.

F. Coordinate requirements for access panels and doors if mechanical items requiring access are concealed behind finished surfaces.

G. Coordinate installation of identifying devices after completing covering and painting, if devices are applied to surfaces. Install identifying devices before installing acoustical ceilings and other concealment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by firms regularly engaged in the manufacture of products required, whose products have been in satisfactory use in similar service.

2.2 PIPE, TUBE, AND FITTINGS

A. Refer to individual Division 22 Piping Sections and "Pipe and Fitting Material Schedule" on the Drawings for pipe, tube, and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS

A. Refer to individual Division 22 Piping Sections and "Pipe and Fitting Material Schedule" on the Drawings for special joining materials not listed below.

B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch (3.2-mm) maximum thickness unless thickness or specific material is indicated.

    a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
    b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.

2. AWWA C110, rubber, flat face, 1/8 inch (3.2 mm) thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.

C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

D. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

E. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

F. Brazing Filler Metals: AWS A5.8, BAg1, silver alloy.

G. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

H. Solvent Cements for Joining Plastic Piping:

1. ABS Piping: ASTM D 2235.
2. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
3. PVC to ABS Piping Transition: ASTM D 3138.

I. Fiberglass Pipe Adhesive: As furnished or recommended by pipe manufacturer.

2.4 DIELECTRIC FITTINGS

A. Description: Combination fitting of copper alloy and ferrous materials with threaded, flanged, solder-joint, plain, or weld-neck end connections that match piping system materials and isolate joined dissimilar metals to prevent galvanic action and stop corrosion.

B. Insulating Material: Suitable for system fluid, pressure, and temperature.

C. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig (2070-kPa) minimum working pressure at 225 degrees F (107 degrees C).

2.5 SLEEVES

A. Galvanized-Steel Sheet: 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint.

B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.

2.6 ESCUTCHEONS

A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.

B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.

C. One-Piece, Cast-Brass Type: With set screw.

1. Finish: Polished chrome-plated.

D. Split-Plate, Stamped-Steel Type: With concealed hinge, spring clips, and chrome-plated finish.

E. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

2.7 GROUT

A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.

1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

2.8 ACCESS PANELS

A. Access Panels (Toilet and Bath Rooms): Flush stainless steel, 180 degrees door with concealed hinges, key-actuated lock, frame and flexible anchor straps.

B. Access Panels: (Elsewhere): Flush metal hinged access panel and frame (type as required for surface encountered), prime coat finish, and key actuated cylinder lock.

C. Access Panels: Minimum size 12 inch x 12 inch. Locate over device to be serviced.

PART 3 - EXECUTION

3.1 MECHANICAL DEMOLITION

A. Refer to Division 1 Sections, "Cutting and Patching" and "Selective Demolition" for general demolition requirements and procedures.

B. Disconnect, demolish, and remove mechanical systems, equipment, and components indicated to be removed.

1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.

C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 PIPING SYSTEMS - COMMON REQUIREMENTS

A. Install piping according to the following requirements and Division 22 Sections specifying piping systems.

B. Install components with pressure rating equal to or greater than system operating pressure.

C. Install piping at right angles or parallel to building walls. Diagonal runs are prohibited, unless otherwise indicated.

D. Install piping tight to slabs, beams, joists, columns, walls, and other building elements. Allow sufficient space above removable ceiling panels to allow for ceiling panel removal.

E. Locate groups of pipes parallel to each other, spaced to permit valve servicing.

F. Install couplings according to manufacturer's written instructions.

G. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

H. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

I. Install all buried water piping, regardless of content, a minimum of 12 inches below and 12 inches laterally from any buried electrical line. Whether in conduit or direct buried cable, this requirement shall apply regardless of voltage of the electrical line.

J. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

K. Install piping to permit valve servicing.

L. Install piping at indicated slopes.

M. Install piping free of sags and bends.

N. Install fittings for changes in direction and branch connections.

O. Pulled-tee, extruded-tee, thread-o-let, weld-o-let, and mitered elbow connections are not acceptable, unless specifically indicated otherwise. Provide manufactured tee and elbow fittings.

P. Install tees with removable threaded cleanout plugs at each change in direction in all condensate drain piping.

Q. Select system components with pressure rating equal to or greater than system operating pressure.

R. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:

1. New Piping:

a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
b. Chrome-Plated Piping: Cast-brass type with chrome-plated finish, split-casing for existing piping, and one-piece for new piping.
c. Insulated and Bare Piping: Split-plate, stamped-steel type with concealed hinge and spring clips.
d. Bare Piping at Floor Penetrations in Equipment Rooms: Split-casting, floor-plate type.

S. Sleeves are not required for core-drilled holes.

T. Permanent sleeves are not required for holes formed by removable PE sleeves.

U. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.

1. Cut sleeves to length for mounting flush with both surfaces.

a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches (50 mm) above finished floor level.

2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
3. Install sleeves that are large enough to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:

a. Steel Pipe Sleeves: For pipes smaller than NPS 6 (DN 150).
b. Steel Sheet Sleeves: For pipes NPS 6 (DN 150) and larger, penetrating interior walls.
c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches (50 mm) above finished floor level. Refer to Division 7 Section, "Sheet Metal Flashing and Trim" for flashing.

1) Seal space outside of sleeve fittings with grout.

4. Seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 7 Section "Joint Sealants" for materials and installation.

V. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 7 Section, "Through-Penetration Firestop Systems" for materials.

W. Verify final equipment locations for roughing-in.

3.3 PIPING JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements, Division 22 Sections, and Schedules on the Drawings, specifying piping systems.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.

H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 Appendixes.
3. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
4. PVC Nonpressure Piping: Join according to ASTM D 2855.
5. PVC to ABS Nonpressure Transition Fittings: Join according to ASTM D 3138 Appendix.

J. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.

K. Plastic Non-Pressure Piping Gasketed Joints: Join according to ASTM D 3212.

3.4 PIPING CONNECTIONS

A. Make connections according to the following, unless otherwise indicated:

1. Install unions, in piping NPS 2 (DN 50) and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Install flanges, in piping NPS 2-1/2 (DN 65) and larger, adjacent to flanged valves and at final connection to each piece of equipment.
3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.5 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Manufacturer's Installation and Operating Instructions: All equipment and material shall be installed and operated in strict accord with manufacturer's "Installation and Operating Instructions." The manufacturer's installation instructions shall become part of this Specification, and shall take precedence over and/or supplement any Specification herein and as shown and/or described on plans. All individual items of equipment and components thereof shall be 100 percent accessible for repair, removal, or replacement without functional impairment or dismantling of any adjoining major surfaces or assemblies.

B. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.

C. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

D. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

E. Install equipment to allow right of way for piping installed at required slope.

F. Cut and drill floors, roofs, walls, partitions, ceilings, and other surfaces as required to permit installation of mechanical piping, ducts, and equipment. Perform cutting by skilled mechanics of trades involved.

G. Repair and refinish disturbed finish materials and other surfaces to match adjacent undisturbed surfaces. Install new fireproofing where existing firestopping has been disturbed. Repair and refinish materials and other surfaces by skilled mechanics of trades involved.

H. Electrical Work: Wherever equipment requiring electrical power connection is specified, all wiring shall be furnished and installed under Division 26 of the Specifications. Starting switches, protective devices, and other means for the operation and control of equipment shall be furnished under the various Division 22 and 23 Sections, and installed and electrically connected complete under Division 26 unless otherwise specifically noted, except that control devices that are installed in or on ducts, piping, or mechanical equipment shall be mounted under Divisions 22 and 23. If equipment is furnished requiring power wiring different from that indicated on the Electrical Drawings, the Contractor furnishing the equipment shall be responsible for any required revisions and pay any additional costs connected therewith. Wiring revisions shall be submitted to the Architect for approval prior to installation.

1. Contractors furnishing items to be wired shall provide adequate wiring diagrams.
2. Temperature control wiring shall be furnished and installed in raceway under Division 23 according to the requirements of Division 26, specifically Section 26 05 19, "Conductors and Cables," and Section 26 05 33, "Raceways and Boxes."

3.6 EARTHWORK

A. Refer to Division 2 Section, "Earthwork" for excavation, trenching and backfilling.

3.7 PAINTING

A. Touching Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils (0.05 mm).

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

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.8 CONCRETE BASES

A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.

1. Construct concrete bases of dimensions indicated, but not less than 4 inches (100 mm) larger in both directions than supported unit.
2. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
3. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete and reinforcement as specified in Division 3.

3.9 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Refer to Division 5 Section, "Metal Fabrications" for structural steel.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.

C. Field Welding: Comply with AWS D1.1.

3.10 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor mechanical materials and equipment.

B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.

C. Attach to substrates as required to support applied loads.

3.11 GROUTING

A. Mix and install grout for mechanical equipment base bearing surfaces, pump and other equipment base plates, and anchors.

B. Clean surfaces that will come into contact with grout.

C. Provide forms as required for placement of grout.

D. Avoid air entrapment during placement of grout.

E. Place grout, completely filling equipment bases.

F. Place grout on concrete bases and provide smooth bearing surface for equipment.

G. Place grout around anchors.

H. Cure placed grout.

3.12 MISCELLANEOUS

A. Services: Provide water, sanitary sewer, and services as indicated.

B. The Contractor shall, before submitting a proposal, verify the location, depth, size, and pressure or grade of existing main gas, water and sewer lines to which he is to make connections for services to the building and shall include in his bid the cost of any required revisions. If for any reason conditions appear that will adversely affect the proper installation and operation of the systems, such conditions shall be reported to the Architect in writing for his decision ten days prior to bid date. All connection charges, cutting and patching of paving, etc. required for connection to utility lines, including those provided by the utility company, shall be paid for or provided by the Contractor. Make provisions for metering as indicated and as required by the serving utilities. Locations of plumbing lines and point of service entrance are shown in accordance with data provided by various departments of city and/or utility companies involved. The points of connection to the utility lines are approximate only and shall be verified by each bidder. Each bidder shall include adequate funds in his bid price to cover all cost of connections to utility lines regardless of exact location, or those who make the connection, and shall hold the Owner harmless as to additional costs or extras regarding utility connections.

C. Sewage Backwater Valves: Where the flood level rims of plumbing fixtures are below the elevation of the manhole cover of the next upstream manhole in the public sewer, such fixtures shall be protected by a backwater valve installed in the building drain, branch of the building drain or horizontal branch serving such fixtures, regardless of whether indicated on the Drawings or not. Plumbing fixtures that have flood level rims above the elevation of the manhole cover of the next upstream manhole in the public sewer shall not discharge through a backwater valve. Where such conditions are found to exist, revise piping as required to install backwater valves. Submit proposed revisions to the Architect for approval. Use of floor drains with integral backwater valves is acceptable where flood level elevations involve only floor drains and do not involve fixtures with flood level rims above the finished floor. Backwater valves shall be accessible.

D. Access Panels: Provide access panels as indicated. In addition, provide access panels for each concealed item requiring service or adjustment that would otherwise be inaccessible whether shown or not. Access panel locations shown on drawings are approximate. Exact location shall be verified with the Architect prior to installation. Deliver access panels to trade responsible for finish surfaces in which access panels are to be installed.

END OF SECTION 22 01 00

SECTION 22 02 00

MOTORS FOR PLUMBING AND HVAC

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 basic requirements for factory-installed and field-installed motors.

B. Related Sections include the following:

1. Division 22 and 23 Sections for application of motors and reference to specific motor requirements for motor-driven equipment.

1.3 SUBMITTALS

A. Product Data for Field-Installed Motors: For each type and size of motor, provide nameplate data and ratings; mounting arrangements; size, type, and location of winding terminations; conduit entry and ground lug locations; and information on coatings or finishes.

B. Operation and Maintenance Data: For field-installed motors to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

1.5 COORDINATION

A. Coordinate features of motors, installed units, and accessory devices. Provide motors that are:

1. Designed and labeled for use with variable frequency controllers, and suitable for use throughout speed range without overheating.
2. Matched to torque and horsepower requirements of the load.
3. Matched to ratings and characteristics of supply circuit and required control sequence.

PART 2 - PRODUCTS

2.1 MOTOR CHARACTERISTICS

A. Motors 1/2 HP and Larger: Three phase.

B. Motors Smaller Than 1/2 HP: Single phase.

C. Frequency Rating: 60 Hz.

D. Voltage Rating: NEMA standard voltage selected to operate on nominal circuit voltage to which motor is connected.

E. Duty: Continuous duty at ambient temperature of 105 degrees F (40 degrees C) and at altitude of 3300 feet (1005 meters) above sea level.

F. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

G. Enclosure: Open drip-proof, unless otherwise indicated.

2.2 POLYPHASE MOTORS

A. Description: NEMA MG 1, Design B, medium induction motor.

B. Energy-Efficient Design: All motors.

1. Comply with Louisiana Energy Code.
2. Comply with EPACT.

C. Stator: Copper windings, unless otherwise indicated.

1. Multispeed motors shall have separate winding for each speed.

D. Rotor: Squirrel cage, unless otherwise indicated.

E. Bearings: Double-shielded, prelubricated ball bearings suitable for radial and thrust loading.

F. Temperature Rise: Match insulation rating, unless otherwise indicated.

G. Insulation: Class F, unless otherwise indicated.

2.3 POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS

A. Motors Used with Variable Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.

1. Designed with critical vibration frequencies outside operating range of controller output.
2. Temperature Rise: Matched to rating for Class B insulation.
3. Insulation: Class H.
4. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.
5. Comply with MG1-31.

2.4 SINGLE-PHASE MOTORS

A. Type: One of the following, to suit starting torque and requirements of specific motor application:

1. Permanent-split capacitor.

B. Shaded-Pole Motors: For motors 1/20 hp and smaller only.

C. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

D. Bearings: Ball type for belt-connected motors and other motors with high radial forces on motor shaft; sealed, prelubricated-sleeve type for other single-phase motors.

PART 3 - EXECUTION

3.1 MOTOR INSTALLATION

A. Anchor each motor assembly to base, adjustable rails, or other support, arranged and sized according to manufacturer's written instructions. Attach by bolting. Level and align with load transfer link.

3.2 FIELD QUALITY CONTROL

A. Prepare for acceptance tests as follows:

1. Run each motor with its controller. Demonstrate correct rotation, alignment, and speed at motor design load.
2. Test interlocks and control features for proper operation.
3. Verify that current in each phase is within nameplate rating.

3.3 CLEANING

A. After completing equipment installation, inspect unit components. Remove paint splatters and other spots, dirt, and debris. Repair damaged finish to match original finish.

B. Clean motors, on completion of installation, according to manufacturer's written instructions.

END OF SECTION 22 02 00

SECTION 22 05 00

HANGERS AND SUPPORTS FOR PLUMBING AND HVAC

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 hangers and supports for mechanical system piping and equipment.

1.3 DEFINITIONS

A. MSS: Manufacturers Standardization Society for the Valve and Fittings Industry.

B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.4 SUBMITTALS

A. Product Data: For each type of pipe hanger, channel support system component, and thermal-hanger shield insert indicated.

B. Welding Certificates: Copies of certificates for welding procedures and operators.

1.5 QUALITY ASSURANCE

A. Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Firms regularly engaged in manufacture of supports and hangers, of types and sizes required, whose products have been in satisfactory use in similar service.

2.2 MANUFACTURED UNITS

A. Pipe Hangers, Supports, and Components: MSS SP-58, factory-fabricated components. Refer to "Hanger and Support Applications" Article in Part 3 for where to use specific hanger and support types.

1. Nonmetallic Coatings: On hangers for electrolytic protection where hangers are in direct contact with copper tubing.

2.3 MISCELLANEOUS MATERIALS

A. Mechanical-Anchor Fasteners: Insert-type attachments with pull-out and shear capacities appropriate for supported loads and building materials where used.

B. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars, black and galvanized.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT APPLICATIONS

A. Specific hanger requirements are specified in Sections specifying equipment and systems.

B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Specification Sections.

C. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Adjustable Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30 (DN15 to DN750).

D. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20 (DN20 to DN500).
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20 (DN20 to DN500), if longer ends are required for riser clamps.

E. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches (150 mm) for heavy loads.
2. Steel Clevises (MSS Type 14): For 120 to 450 degrees F (49 to 232 degrees C) piping installations.
3. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.

F. Building Attachments: Except as otherwise indicated, provide factory-fabricated building attachments complying with ANSI/MSS SP-58, selected by Installer to suit building substrate conditions, in accordance with MSS SP-69 and manufacturer's published product information. Select size of building attachments to suit hanger rods.

G. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Protection Shields (MSS Type 40): Of length recommended by manufacturer to prevent crushing insulation.

H. Thermal-Hanger Shield Inserts:

1. Description: 100 psig (690 kPa) minimum, compressive-strength insulation insert encased in sheet metal shield.
2. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with vapor barrier.

3. Insulation-Insert Material for Hot Piping: ASTM C 552, Type II cellular glass.
4. For Hangers and Clamped Systems: Insert and shield shall cover entire circumference of pipe.
5. Insert Length: Extend 2 inches (50 mm) beyond sheet metal shield for piping operating below ambient air temperature.

3.2 HANGER AND SUPPORT INSTALLATION

A. Pipe Hanger and Support Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure. All hangers for equipment and piping are to be supported from building structure even if structural enhancements to roof support is required.

B. Install building attachments within concrete slabs or attach to structural steel. Space attachments within maximum piping span length indicated in MSS SP-69. Install additional attachments at concentrated loads, including valves, flanges, guides, strainers, and expansion joints, and at changes in direction of piping.

C. Install mechanical-anchor fasteners in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

D. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.

E. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

F. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

G. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.9, "Building Services Piping," is not exceeded.

H. Do not use wire or perforated metal to support piping, and do not support piping from other piping.

I. Support vertical piping at each floor and roof.

J. Insulated Piping: Comply with the following:

1. All hangers and supports shall be external of insulation.
2. Install MSS SP-58, Type 40 protective shields on all insulated piping. Shields shall span arc of 180 degrees.
3. Shield Dimensions for Pipe: Not less than the following:

    a. NPS 1/4 to NPS 3-1/2 (DN8 to DN90): 12 inches (305 mm) long and 0.048 inch (1.22 mm) thick.
    b. NPS 4 (DN100): 12 inches (305 mm) long and 0.06 inch (1.52 mm) thick.
    c. NPS 5 and NPS 6 (DN125 and DN150): 18 inches (457 mm) long and 0.06 inch (1.52 mm) thick.
    d. NPS 8 to NPS 14 (DN200 to DN350): 24 inches (610 mm) long and 0.075 inch (1.91 mm) thick.

3.3 EQUIPMENT SUPPORTS

A. Fabricate structural-steel stands to suspend equipment from structure above or to support equipment above floor.

3.4 METAL FABRICATION

A. Cut, drill, and fit miscellaneous metal fabrications for heavy-duty steel trapezes and equipment supports.

B. Field Welding: Comply with AWS D1.1 procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.

C. Any vertical structural members required to form overhead attachments for hangers or equipment supports shall be located adjacent to walls and any horizontal members be adjacent to the roof structure.

3.5 ADJUSTING

A. Hanger Adjustment: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

3.6 PAINTING

A. Touching Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 9 Sections.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint.

END OF SECTION 22 05 00

SECTION 22 05 53

MECHANICAL IDENTIFICATION FOR PLUMBING AND HVAC PIPING

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 mechanical identification materials and devices.

1.3 SUBMITTALS

A. Product Data: For identification materials and devices.

B. Samples: Of color, lettering style, and graphic representation required for each identification material and device.

1.4 QUALITY ASSURANCE

A. Comply with ASME A13.1, "Scheme for the Identification of Piping Systems" for lettering size, length of color field, colors, and viewing angles of identification devices.

1.5 SEQUENCING AND SCHEDULING

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

PART 2 - PRODUCTS

2.1 IDENTIFYING DEVICES AND LABELS

A. General: Products specified are for applications referenced in other Division 23 Sections. If more than single type is specified for listed applications, selection is Installer's option.

B. Snap-On Plastic Pipe Markers: Manufacturer's standard preprinted, semirigid, snap-on type. Include color-coding according to ASME A13.1, unless otherwise indicated.

C. Pipes with OD, Including Insulation, Less Than 6 Inches (150 mm): Full-band pipe markers, extending 360 degrees around pipe at each location.

D. Pipes with OD, Including Insulation, 6 Inches (150 mm) and Larger: Either full-band or strip-type pipe markers, at least 3 times letter height and of length required for label.

E. Lettering: Manufacturer's standard preprinted captions as selected by Engineer.

1. Arrows: Either integrally with piping system service lettering, to accommodate both directions, or as separate unit, on each pipe marker to indicate direction of flow.

F. Plastic Tape: Manufacturer's standard color-coded, pressure-sensitive, self-adhesive, vinyl tape, at least 3 mils (0.08 mm) thick.

1. Width: 1-1/2 inches (40 mm) on pipes with OD, including insulation, less than 6 inches (150 mm); 2-1/2 inches (65 mm) for larger pipes.
2. Color: Comply with ASME A13.1, unless otherwise indicated.

G. Lettering and Graphics: Coordinate names, abbreviations, and other designations used in mechanical identification with corresponding designations indicated. Use numbers, letters, and terms indicated for proper identification, operation, and maintenance of mechanical systems and equipment.

1. Multiple Systems: Identify individual system number and service if multiple systems of same name are indicated.

PART 3 - EXECUTION

3.1 LABELING AND IDENTIFYING PIPING SYSTEMS

A. Install pipe markers on each system. Include arrows showing normal direction of flow.

B. Marker Type: Plastic markers, with application systems.

C. Fasten markers on pipes and insulated pipes smaller than 6 inches (150 mm) OD by one of following methods:

1. Snap-on application of pre-tensioned, semi-rigid plastic pipe marker.

D. Fasten markers on pipes and insulated pipes 6 inches (150 mm) in diameter and larger by one of following methods:

1. Laminated or bonded application of pipe marker to pipe or insulation.
2. Taped to pipe or insulation with color-coded plastic adhesive tape, not less than 1-1/2 inches (40 mm) wide, lapped a minimum of 3 inches (75 mm) at both ends of pipe marker, and covering full circumference of pipe.
3. Strapped to pipe or insulation with manufacturer's standard stainless-steel bands.

E. Locate pipe markers and color bands where piping is exposed; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior nonconcealed locations according to the following:

1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs. Mark each pipe at branch, where flow pattern is not obvious.
3. Near penetrations through walls, floors, ceilings, or nonaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at a maximum of 50-foot (15-meters) intervals along each run. Reduce intervals to 25 feet (7.5 meters) in areas of congested piping and equipment.

3.2 ADJUSTING AND CLEANING

A. Relocate mechanical identification materials and devices that have become visually blocked by work of this or other Divisions.

B. Clean faces of identification devices and glass frames of valve charts.

END OF SECTION 22 05 53

SECTION 22 07 19

PIPE INSULATION FOR PLUMBING AND HVAC PIPING

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 preformed, rigid and flexible pipe insulation; insulating cements; field-applied jackets; accessories and attachments; and sealing compounds.

B. Related Sections include the following:

1. Division 22 Section, "Hangers and Supports" for pipe insulation shields and protection saddles.

1.3 SUBMITTALS

A. Product Data: Identify thermal conductivity, thickness, and jackets, for each type of product indicated.

B. Installer Certificates: Signed by the Contractor certifying that installers comply with requirements.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the U.S. Department of Labor, Bureau of Apprenticeship and Training.

B. Fire-Test-Response Characteristics: As determined by testing materials identical to those specified in this Section according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and sealer and cement material containers with appropriate markings of applicable testing and inspecting agency.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Ship insulation materials in containers marked by manufacturer with appropriate ASTM specification designation, type and grade, and maximum use temperature.

1.6 COORDINATION

A. Coordinate size and location of supports, hangers, and insulation shields specified in Division 22 Section, "Hangers and Supports for."

B. Coordinate clearance requirements with piping Installer for insulation application.

C. Coordinate installation and testing of steam or electric heat tracing.

1.7 SCHEDULING

A. Schedule insulation application after testing piping systems. Insulation application may begin on segments of piping that have satisfactory test results.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, manufacturers regularly engaged in the manufacture of piping insulation products of the types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

2.2 INSULATION MATERIALS

A. Mineral-Fiber Insulation: Glass fibers bonded with a thermosetting resin complying with the following:

1. Preformed Pipe Insulation: Comply with ASTM C 547, Type 1, with factory-applied, all-purpose, vapor-retarder jacket.
2. Blanket Insulation: Comply with ASTM C 553, Type II, without facing.
3. Fire-Resistant Adhesive: Comply with MIL-A-3316C in the following classes and grades:

    a. Class 1, Grade A for bonding glass cloth and tape to unfaced glass-fiber insulation, for sealing edges of glass-fiber insulation, and for bonding lagging cloth to unfaced glass-fiber insulation.
    b. Class 2, Grade A for bonding glass-fiber insulation to metal surfaces.

4. Vapor-Retarder Mastics: Fire- and water-resistant, vapor-retarder mastic for indoor applications. Comply with MIL-C-19565C, Type II.
5. Mineral-Fiber Insulating Cements: Comply with ASTM C 195.
6. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449/C 449M.

2.3 FIELD-APPLIED JACKETS

A. PVC Jacket: High-impact, ultraviolet-resistant PVC; 20 mils (0.5 mm) thick; pre-curled ready for shop or field cutting and installing.

1. Adhesive: As recommended by insulation material manufacturer.
2. PVC Jacket Color: White or gray.

B. Standard PVC Fitting Covers: Factory-fabricated fitting covers manufactured from 20-mil- (0.5 mm-) thick, high-impact, ultraviolet-resistant PVC.

1. Shapes: 45 and 90 degree, short- and long-radius elbows, tees, valves, flanges, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories for the disabled.
2. Adhesive: As recommended by insulation material manufacturer.

2.4 ACCESSORIES AND ATTACHMENTS

A. Glass Cloth and Tape: Comply with MIL-C-20079H, Type I for cloth and Type II for tape. Woven glass-fiber fabrics, plain weave, pre-sized a minimum of 8 oz./sq. yd. (270 g/sq. m).

1. Tape Width: 4 inches (100 mm).

B. Bands: 3/4 inch (19 mm) wide, in one of the following materials compatible with jacket:

1. Stainless Steel: ASTM A 666, Type 304; 0.020 inch (0.5 mm) thick.

C. Wire: 0.080 inch (2.0 mm), nickel-copper alloy; 0.062 inch (1.6 mm), soft-annealed, stainless steel; or 0.062 inch (1.6 mm), soft-annealed, galvanized steel.

2.5 VAPOR RETARDERS

A. Mastics: Materials recommended by insulation material manufacturer that are compatible with insulation materials, jackets, and substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry pipe and fitting surfaces. Remove materials that will adversely affect insulation application.

3.3 GENERAL APPLICATION REQUIREMENTS

A. Apply insulation materials, accessories, and finishes according to the manufacturer's written instructions; with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.

B. Refer to schedules at the end of this Section for materials, forms, jackets, and thicknesses required for each piping system.

C. Use accessories compatible with insulation materials and suitable for the service. Use accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Apply insulation with longitudinal seams at top and bottom of horizontal pipe runs.

E. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

F. Seal joints and seams with vapor-retarder mastic.

G. Keep insulation materials dry during application and finishing.

H. Apply insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by the insulation material manufacturer.

I. Apply insulation with the least number of joints practical.

J. Apply insulation over fittings, valves, and specialties, with continuous thermal and vapor-retarder integrity, unless otherwise indicated. Refer to special instructions for applying insulation over fittings, valves, and specialties.

K. Hangers and Anchors: Where vapor retarder is indicated, seal penetrations in insulation at hangers, supports, anchors, and other projections with vapor-retarder mastic.

1. Apply insulation continuously through hangers and around anchor attachments.
2. Install insert materials and apply insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by the insulation material manufacturer.
3. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect the jacket from tear or puncture by the hanger, support, and shield.

L. Insulation Terminations: For insulation application where vapor retarders are indicated, taper insulation ends. Seal tapered ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.

M. Apply adhesives and mastics at the manufacturer's recommended coverage rate.

N. Apply insulation with integral jackets as follows:

1. Pull jacket tight and smooth.
2. Circumferential Joints: Cover with 3 inch- (75 mm-) wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip and spaced 4 inches (100 mm) o.c.
3. Longitudinal Seams: Overlap jacket seams at least 1-1/2 inches (40 mm). Apply insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches (100 mm) o.c.

    a. Exception: Do not staple longitudinal laps on insulation having a vapor retarder.

4. Vapor-Retarder Mastics: Where vapor retarders are indicated, apply mastic on seams and joints and at ends adjacent to flanges, unions, valves, and fittings.
5. At penetrations in jackets for thermometers and pressure gages, fill and seal voids with vapor-retarder mastic.

O. Interior Wall and Partition Penetrations: Apply insulation continuously through walls and floors.

P. Fire-Rated Wall and Partition Penetrations: Apply insulation continuously through penetrations of fire-rated walls and partitions.

3.4 MINERAL-FIBER INSULATION APPLICATION

A. Apply insulation to straight pipes and tubes as follows:

1. Secure each layer of preformed pipe insulation to pipe with wire, tape, or bands without deforming insulation materials.
2. Where vapor retarders are indicated, seal longitudinal seams and end joints with vapor-retarder mastic. Apply vapor retarder to ends of insulation at intervals of 15 to 20 feet (4.5 to 6 m) to form a vapor retarder between pipe insulation segments.
3. For insulation with factory-applied jackets with vapor retarders, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by the insulation material manufacturer and seal with vapor-retarder mastic.

B. Apply insulation to flanges as follows:

1. Apply preformed pipe insulation to outer diameter of pipe flange.

2. Make width of insulation segment the same as overall width of the flange and bolts, plus twice the thickness of the pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Apply canvas jacket material with manufacturer's recommended adhesive, overlapping seams at least 1 inch (25 mm), and seal joints with vapor-retarder mastic.

C. Apply insulation to fittings and elbows as follows:

1. Apply premolded insulation sections of the same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When premolded insulation elbows and fittings are not available, apply mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire, tape, or bands.
3. Apply canvas jacket material with manufacturer's recommended adhesive, overlapping seams at least 1 inch (25 mm), and seal joints with vapor-retarder mastic.

D. Apply insulation to valves and specialties as follows:

1. Apply premolded insulation sections of the same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When premolded insulation sections are not available, apply glass-fiber blanket insulation to valve body to thickness equal to adjoining pipe insulation. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation. For check valves, arrange insulation for access to stainer basket without disturbing insulation.
3. Apply insulation to flanges as specified for flange insulation application.
4. Apply canvas jacket material with manufacturer's recommended adhesive, overlapping seams at least 1 inch (25 mm), and seal joints with vapor-retarder mastic.

3.5 FIELD-APPLIED JACKET APPLICATION

A. Apply PVC jacket over all piping, fittings, valves, flanges, etc. located in equipment rooms and mechanical rooms, up to an elevation of 6'-0" above the finished floor of the space. Apply with 1 inch (25 mm) overlap at longitudinal seams and end joints. Seal with manufacturers' recommended adhesive.

3.6 PIPING SYSTEM APPLICATIONS

A. Insulation materials and thicknesses are specified in schedules at the end of this Section.

B. Items Not Insulated: Unless otherwise indicated, do not apply insulation to the following systems, materials, and equipment:

1. Flexible connectors.
2. Vibration-control devices.

3.7 FIELD QUALITY CONTROL

A. Insulation applications will be considered defective if sample inspection reveals noncompliance with requirements. Remove defective Work and replace with new materials according to these Specifications.

B. Reinstall insulation and covers on fittings and valves if required to be uncovered for inspection according to these Specifications.

3.8 INSULATION APPLICATION SCHEDULE, GENERAL

A. Refer to insulation application schedules for required insulation materials, vapor retarders, and field-applied jackets.

B. Application schedules identify piping system and indicate pipe size ranges and material, thickness, and jacket requirements.

3.9 INTERIOR INSULATION APPLICATION SCHEDULE

A. This application schedule is for interior insulation inside both the main building and the equipment building on the roof.

B. Service: Domestic cold water.

1. Operating Temperature: 35 to 60 deg F (2 to 15 deg C).
2. Insulation Material: Mineral fiber.
3. Insulation Thickness: Apply the following insulation thicknesses:

a. Copper Pipe, 1 Inch and Smaller: 1/2 inch.
b. Copper Pipe, 1-1/4 Inches and Larger: 1 inch.

4. Field-Applied Jacket: PVC for exposed piping in Equipment Rooms.
5. Vapor Retarder Required: Yes.
6. Finish: None.

C. Service: Domestic hot water and hot water return.

1. Operating Temperature: 60 to 140 deg F (15 to 60 deg C).
2. Insulation Material: Mineral fiber.
3. Insulation Thickness: Apply the following thicknesses:

a. Runouts up to 2 Inches and less than 12 Foot length: 1/2 inch.
b. 2 Inches size and less: 1 inch.
c. 2-1/2 Inches size and larger: 1-1/2 inches.

4. Field-Applied Jacket: PVC for exposed piping in Mechanical Rooms.
5. Vapor Retarder Required: No.
6. Finish: None.

D. Service: Exposed sanitary drains and domestic water supplies and stops for fixtures for the disabled.

1. Insulate and jacket with factory insulation and white PVC jacket kit conforming to ADA and equivalent to Truebro “Handi Lav-Guard”, McGuire Manufacturing Co. “Pro Wrap”, or approved equivalent.

E. Service: Interior, Chilled-water supply and return.

1. Operating Temperature: 35 to 75 degrees F (2 to 24 degrees C).
2. Insulation Material: Mineral Fiber.
3. Insulation Thickness: Apply the following insulation thicknesses:

a. Steel Pipe, 4 inches and Larger: 1 ½ inches.

4. Field-Applied Jacket: PVC for exposed piping in crawl space.
5. Vapor Retarder Required: Yes.
6. Finish: None.

F. Service: Heating hot-water supply and return.

1. Operating Temperature: 100 to 200 degrees F (38 to 93 degrees C).
2. Insulation Material: Mineral fiber.
3. Insulation Thickness: Apply the following insulation thicknesses:

    a. Steel Pipe, all sizes: 1-1/2 inches.

4. Field Applied Jacket: PVC for exposed piping in crawl space.
5. Vapor Retarder Required: No.
6. Finish: None.

G. Service: Refrigerant suction and vapor piping.

1. Operating Temperature: 35 to 50 deg F (2 to 10 deg C).
2. Insulation Material: Flexible elastomeric.
3. Insulation Thickness: 3/4 inch.
4. Finish: None.

3.10 EXTERIOR INSULATION APPLICATION SCHEDULE

A. This application schedule is for aboveground insulation outside the building.

B. Service: Refrigerant suction.

1. Operating Temperature: 35 to 50 deg F (2 to 10 deg C).
2. Insulation Material: Flexible elastomeric.
3. Insulation Thickness: 3/4 inch.
4. Finish: Painted with two coats of ultraviolet-protective coating.

END OF SECTION 22 07 19

SECTION 22 11 16

DOMESTIC WATER PIPING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

A. Extent of domestic water piping systems work is indicated on the Drawings and schedules and by requirements of this Section.

B. Applications for domestic water piping systems include the following:

1. Domestic cold-water piping.
2. Domestic hot-water piping.

C. Refer to appropriate Division 22 Sections for insulation required in connection with domestic water piping; not work of this Section.

D. Trenching and backfill required in conjunction with exterior water piping is specified in applicable Division 2 Sections and is included as work of this Section.

1.3 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in manufacture of domestic water piping systems products, of types, materials, and sizes required, whose products have been in satisfactory use in similar service.

B. Plumbing Code Compliance: Comply with applicable portions of governing Plumbing Code pertaining to plumbing materials, construction, and installation of products.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's data for domestic water piping systems, materials, and products.

PART 2 - PRODUCTS

2.1 DOMESTIC WATER PIPING MATERIALS AND PRODUCTS

A. General: Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, temperature ratings, and capacities as indicated and scheduled. Where not indicated or scheduled, provide proper selection as determined by Installer to comply with installation requirements. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in domestic water piping systems. Where more than one type of material or product is indicated, selection is Installer's option.

2.2 BASIC IDENTIFICATION

A. General: Provide identification complying with Division 22 Section 22 01 00, "Basic Mechanical Materials and Methods for Plumbing and HVAC," in accordance with the following listing:

2.3 BASIC PIPE, TUBE, AND FITTINGS

A. General: Provide pipe, tube, and fittings complying with Division 22 Section 22 01 00, "Basic Mechanical Materials and Methods for Plumbing and HVAC," in accordance with the schedule on the Drawings.

2.4 BASIC HANGERS AND SUPPORTS

A. General: Provide hangers and supports complying with Division 22 Section 22 05 00, "Hangers and Supports for Plumbing and HVAC."

2.5 BASIC VALVES

A. Ball Valves – 2 Inches (DN50) and Smaller: MSS SP-110, Class 150, 600 psi (4140 kPa) CWP, ASTM B 584 bronze body and bonnet, 2-piece construction; chrome-plated brass ball, standard port for 1/2 inch (DN15) valves and smaller and conventional port for 3/4 inch (DN20) valves and larger; blowout proof; bronze or brass stem; teflon seats and seals; threaded end connections.

1. Operator: Vinyl-covered steel lever handle.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved equivalent:

    a. Milwaukee, BA100.
    b. Appollo, #70-100.
    c. Hammond, #8501.
    d. Nibco, #585.

2.6 SPECIAL VALVES

A. General: Special valves required for domestic water piping systems include the following types:

1. Interior Hose Bibb: 3/4 inch angle sill faucet, polished chrome plated, fixed wheel handle, and with vacuum breaker.

2.7 TRAP SEAL PRIMER VALVES

A. Supply-Type Trap Seal Primer Valves: ASSE 1018, water-supply-fed type, with the following characteristics. Provide where a trap primer is required by code or is shown on the Drawings.

1. Manufacturers:

    a. Precision Plumbing Products, Inc.

2. 125-psig (860-kPa) minimum working pressure.
3. Bronze body with atmospheric-vented drain chamber.
4. Inlet and Outlet Connections: NPS 1/2 (DN 15) threaded, union, or solder joint.
5. Gravity Drain Outlet Connection: NPS 1/2 (DN 15) threaded or solder joint.
6. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

2.8 DRAIN VALVES

A. Hose-End Drain Valves: MSS SP-110, NPS 3/4 (DN 20) ball valve, rated for 400-psig (2760-kPa) minimum CWP. Include two-piece, copper-alloy body with standard port, chrome-plated brass ball, replaceable seats and seals, blowout-proof stem, and vinyl-covered steel handle.

1. Inlet: Threaded or solder joint.
2. Outlet: Short-threaded nipple with ASME B1.20.7, garden-hose threads and cap.

2.9 WATER HAMMER ARRESTERS

A. General: ASSE 1010 or PDI-WH 201, piston type with pressurized metal-tube cushioning chamber. Sizes indicated are based on ASSE 1010, Sizes AA and A through F or PDI-WH 201, Sizes A through F.

1. Manufacturers:

a. Josam Co.
b. Precision Plumbing Products, Inc.
c. Sioux Chief Manufacturing Co., Inc.
d. Zurn Industries, Inc.; Wilkins Div.

PART 3 - EXECUTION

3.1 EXCAVATION

A. Excavating, trenching, and backfilling are specified in Division 2 Section, "Earthwork."

3.2 INSTALLATION OF DOMESTIC WATER PIPING

A. General: Install water distribution piping in accordance with Division 22 Section 22 01 00, "Basic Mechanical Materials and Methods for Plumbing and HVAC Systems."

3.3 INSTALLATION OF PIPING SPECIALTIES

A. Water Hammer Arresters: Install in upright position, in locations and of sizes in accordance with PDI Standard WH-201, and elsewhere as indicated.

B. Trap Seal Primer Valves: Install trap seal primer valves with outlet pitched down toward drain tap a minimum of 1 percent and connect to floor drain, trap or inlet fitting. Adjust valve for proper flow.

C. Install wood blocking reinforcement for wall mounting and recessed type plumbing specialties.

D. Install individual ball type shutoff valve in water supply to trap seal primer valve and install minimum 12 inches x 12 inches access panel over valve and trap primer.

3.4 INSTALLATION OF HANGERS AND SUPPORTS

A. Install hangers and supports in accordance with Division 22 Section 22 05 00, "Hangers and Supports for Plumbing and HVAC."

3.5 EQUIPMENT CONNECTIONS

A. Piping Runouts to Fixtures: Provide hot and cold water piping runouts to fixtures of sizes indicated, but in no case smaller than required by governing Plumbing Code.

3.6 FIELD QUALITY CONTROL

A. Test water and hot water piping throughout hydrostatically at 150 p.s.i.g. (four hours).

B. Repair or replace domestic water piping as required to eliminate leaks and retest as specified to demonstrate compliance.

C. Sterilization: Sterilize all water lines in strict accordance with State Board of Health requirements. After flushing out, obtain approval of water sample analysis from State Board of Health and submit to Architect.

END OF SECTION 22 11 16

SECTION 22 13 16

SOIL, WASTE, AND VENT PIPING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

A. Extent of soil, waste, and vent piping system work is indicated on Drawings and Schedules, and by requirements of this Section.

B. Trenching and backfilling required in conjunction with underground drain piping is specified in applicable Division 2 Sections and is included as work of this Section.

1.3 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in manufacture of piping products of types, materials, and sizes required, whose products have been in satisfactory use in similar service.

B. Plumbing Code Compliance: Comply with applicable portions of governing Plumbing Code pertaining to plumbing materials, construction, and installation of products.

C. ANSI Compliance: Comply with applicable American National Standards pertaining to products and installation of soil, waste, and vent piping systems.

D. PDI Compliance: Comply with applicable Plumbing and Drainage Institute Standards pertaining to products and installation of soil, waste, and vent piping systems.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's data for soil, waste, and vent piping systems materials and products.

PART 2 - PRODUCTS

2.1 SOIL, WASTE AND VENT PIPING MATERIALS AND PRODUCTS

A. General: Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in soil, waste, and vent piping systems. Where more than one type of materials or product is indicated, selection is Installer's option.

2.2 BASIC PIPE, TUBE AND FITTINGS

A. General: Provide pipe, tube, and fittings complying with Division 22 Section 22 01 00, "Basic Mechanical Materials and Methods for Plumbing and HVAC," in accordance with the Schedule on the Drawings.

2.3 BASIC HANGERS AND SUPPORTS

A. General: Provide hangers and supports complying with Division 22 Section 22 05 00, "Hangers and Supports for Plumbing and HVAC."

2.4 DRAINAGE PIPING PRODUCTS

A. General: Provide factory-fabricated drainage piping products of size and type indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements and governing regulations.

B. Cleanout Plugs: Cast-bronze or brass, threaded, countersunk head.

C. Floor Cleanouts: Cast-iron body and frame; cleanout plug; adjustable round top as follows:

1. Nickel-Bronze Top: Manufacturers standard cast unit of the pattern indicated:

a. Pattern: Exposed rim type, with recess to receive 1/8 inch thick resilient floor finish where applicable.
b. Pattern: Exposed rim type, with recess to receive 1 inch thick terrazzo floor finish where applicable.
c. Pattern: Exposed flush type, standard non-slip scored or abrasive finish.
d. Carpet Marker: Include approximately 1-1/4 inches diameter carpet marker for cleanouts that occur in carpeted areas.

D. Wall Cleanouts: Cast-iron body adaptable to pipe with cast-bronze or brass cleanout plug; stainless steel cover including screws.

E. Flashing: As approved by metal roof manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION OF SOIL, WASTE AND VENT ABOVE GROUND PIPING

A. General: Install soil, waste, and vent piping in accordance with Division 22 Section 22 01 00, "Basic Mechanical Materials and Methods for Plumbing and HVAC," and with governing Plumbing Code.

B. Flashing: Flash all vent penetrations through roofs as approved by roof manufacturer. Offset vents where necessary to provide 2 feet – 0 inches minimum clearance from other flashing such as outside walls, curbs, etc. All flashing shall be as approved by roofing manufacturer.

3.2 INSTALLATION OF BUILDING DRAIN PIPING

A. General: Install underground building drains as indicated and in accordance with governing Plumbing Code. Lay underground building drains beginning at low point of systems, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install required gaskets in accordance with manufacturer's recommendations for use of lubricants, cements, and other special installation requirements. Clean interior of piping of dirt and other superfluous material as work progresses. Maintain swab or drag-in-line and pull past each joint as it is completed. Place plugs in ends of uncompleted piping at end of day or whenever work stops.

B. Install soil, waste and vent piping pitched to drain at minimum slope of 1/4 inch per foot (2 percent) for piping 3 inches and smaller, and 1/8 inch per foot (1 percent) for piping 4 inches and larger.

3.3 INSTALLATION OF HANGERS AND SUPPORTS

A. Install hangers and supports in accordance with Division 22 Section 22 05 00, "Hangers and Supports for Plumbing and HVAC."

3.4 INSTALLATION OF DRAINAGE PIPING PRODUCTS

A. Cleanouts: Install in sanitary aboveground piping and sanitary building drain piping as indicated, as required by governing Plumbing Code; and at each change in direction of piping greater than 45 degrees; at minimum intervals of 50 feet for piping 4 inches and smaller and 100 feet for larger piping; and at base of each vertical soil or waste stack. Install floor and wall cleanout covers for concealed piping, select type to match adjacent building finish. Cleanouts shall be same size as pipe up to 4 inches and not less than 4 inches for larger pipe. All cleanouts shall be accessible. All cleanouts shall be opened, cleaned, and greased after all concrete work is completed.

B. Outside cleanouts shall be brought up flush with finish grade or paving. Where at grade, they shall be set in 14 inches x 14 inches x 5 inches concrete pads.

C. Inside cleanouts shall be brought up flush with floors and provided with cleanout covers or in wall with wall cleanout cover.

3.5 EQUIPMENT CONNECTIONS

A. Piping Runouts to Fixtures: Provide soil and waste piping runouts to equipment, plumbing fixtures, and drains with approved trap of sizes indicated; but in no case smaller than required by governing Plumbing Code. Comply with equipment manufacturer's instructions where not indicated otherwise.

3.6 PIPING TESTS

A. Test soil, waste, and vent piping system in accordance with requirements of governing Plumbing Code, but not less than 10 foot head water test.

END OF SECTION 22 13 16

SECTION 22 42 13

PLUMBING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

A. Extent of plumbing fixtures and trim work is indicated by Drawings and Schedules, and by requirements of this Section.

B. Types of plumbing fixtures required for the project are indicated by the Drawings and Schedules.

C. Refer to Division 22 Sections for domestic water piping systems used in conjunction with plumbing fixtures; not work of this Section.

D. Refer to Division 22 Sections for soil and waste piping systems used in conjunction with plumbing fixtures; not work of this Section.

1.3 QUALITY ASSURANCE

A. Manufacturers: Provide products by one of the manufacturers listed in the Schedule on the Drawings or approved equivalent.

B. Plumbing Fixture Standards: Comply with applicable portions of governing Plumbing Code pertaining to materials and installation of plumbing fixtures.

C. Regulatory Requirements: Comply with requirements of CABO A117.1, "Accessible and Usable Buildings and Facilities;" Public Law 90-480, "Architectural Barriers Act;" and Public Law 101-336, "Americans with Disabilities Act;" regarding plumbing fixtures for physically handicapped people.

D. PDI Compliance: Comply with standards established by Plumbing and Drainage Institute pertaining to plumbing fixture supports.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's specifications for plumbing fixtures and trim, including catalog cut of each fixture type and trim item furnished, roughing-in dimensioned drawings, templates for cutting substrates, fixture carriers, and installation instructions.

B. Maintenance Data: Submit maintenance data and parts lists for each fixture type and trim item, including instructions for care of finishes. Include this data in maintenance manual.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver plumbing fixtures individually wrapped in factory-fabricated containers.

B. Handle plumbing fixtures carefully to prevent breakage, chipping, and scoring the fixture finish. Do not install damaged plumbing fixtures; replace and return damaged units to equipment manufacturer.

PART 2 - PRODUCTS

2.1 PLUMBING FIXTURES

A. General: Provide factory-fabricated fixtures of type, style, and material indicated. For each type fixture, provide fixture manufacturer's standard trim, carrier, seats, and valves as indicated by their published product information; either as designed and constructed, or as recommended by the manufacturer, and as required for a complete installation. Where more than one type is indicated, selection is Installer's option; but, all fixtures of same type must be furnished by single manufacturer. Where type is not otherwise indicated, provide fixtures complying with governing regulations.

2.2 MATERIALS

A. General: Provide materials which have been selected for their surface flatness and smoothness. Exposed surfaces which exhibit pitting, seam marks, roller marks, foundry sand holes, stains, discoloration, or other surface imperfections on finished units are not acceptable.

B. Where fittings, trim and accessories are exposed or semi-exposed, provide bright chrome-plated or polished stainless steel units. Provide copper or brass where not exposed.

C. Stainless Steel Sheets: Type 302/304, hardest workable temper.

1. Finishes: No. 4, bright, directional polish on exposed surfaces.

D. Vitreous China: High quality, free from fire cracks, spots, blisters, pinholes, and specks; glaze exposed surfaces.

2.3 PLUMBING FITTINGS, TRIM AND ACCESSORIES

A. P-Traps: Include removable P-traps where drains are indicated for direct connection to drainage system.

B. Escutcheons: Where fixture supplies and drains penetrate walls in exposed locations and within cabinets, provide chrome plated cast-brass escutcheons with set screw.

C. Aerators: Provide aerators of types approved by Health Departments having jurisdiction.

D. Comply with additional fixture requirements contained in fixture schedule on drawings.

E. Floor Drains: Provide drains equivalent to that scheduled on drawings. Provide minimum top size of 5 inches for 2 inches size, 6 inches for 3 inches size, and 10 inches for 4 inches size. Include clamping ring for drains in waterproofed membrane floors. Provide drains with water passage size not smaller than outlet size.

F. Trap Primer Valves: Refer to Division 22 Section 22 11 16, "Domestic Water Piping."

PART 3 - EXECUTION

3.1 INSPECTION AND PREPARATION

A. Examine roughing-in work of domestic water and waste piping systems to verify actual locations of piping connections prior to installing fixtures. Also examine floors and substrates, and conditions under which fixture work is to be accomplished. Correct any incorrect locations of piping and other unsatisfactory conditions for installation of plumbing fixtures. Do not proceed with work until unsatisfactory conditions have been corrected.

B. Install plumbing fixtures of types indicated where shown and at indicated heights; in accordance with fixture manufacturer's written instructions, roughing-in drawings, and with recognized industry practices. Ensure that plumbing fixtures comply with requirements and serve intended purposes. Comply with applicable requirements of the governing Plumbing Code pertaining to installation of plumbing fixtures.

C. Fasten plumbing fixtures securely to indicated supports or building structure; and ensure that fixtures are level and plumb. Secure plumbing supplies behind or within all construction so as to be rigid and not subject to pull or push movement. Secure with bolts full size of hanger drilling, through-wall where practicable, with back plates.

D. Provide deep seal P-trap at each floor drain. In waterproofed, membrane floors, secure waterproofing with clamping ring.

3.2 CLEAN AND PROTECT

A. Clean plumbing fixtures of dirt and debris upon completion of installation.

B. Protect installed fixtures from damage during the remainder of the construction period.

3.3 FIELD QUALITY CONTROL

A. Upon completion of installation of plumbing fixtures and after units are water pressurized, test fixtures to demonstrate capability and compliance with requirements. Test floor drains for free flow. When possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units and proceed with retesting.

B. Inspect each installed unit for damage to finish. If feasible, restore and match finish to original at site; otherwise, remove fixture and replace with new unit. Feasibility and match to be judged by Architect. Remove cracked or dented units and replace with new units.

END OF SECTION 22 42 13

DIVISION 23
HEATING, VENTILATING, AND AIR CONDITIONING

23 05 93	TESTING, ADJUSTING AND BALANCING
23 07 13	DUCT INSULATION
23 17 16	CONDENSATE DRAIN PIPING
23 21 13	HYDRONIC PIPING
23 23 00	REFRIGERANT PIPING
23 31 13	METAL DUCTS
23 33 00	DUCTWORK ACCESSORIES
23 34 23	POWER VENTILATORS
23 37 13	DIFFUSERS, REGISTERS AND GRILLES
23 73 13	MODULAR INDOOR AIR HANDLING UNITS
23 81 26	SPLIT SYSTEM AIR CONDITIONING UNITS
23 81 29	VARIABLE REFRIGERANT VOLUME HEAT RECOVERY CONDENSING UNIT
23 81 30	MULTI EVAPORATOR DX SPLIT SYSTEM INDOOR UNITS

SECTION 230593

TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. All Division 22/23 Specification Sections, Drawings, and general provisions of the contract apply to work of this Section, as do other documents referred to in this Section.

1.2 SCOPE OF WORK

A. The Contractor shall obtain the services of an independent Test and Balance (TAB) Company which specializes in the testing and balancing of heating, ventilating and air conditioning (HVAC) systems to test, adjust and balance all HVAC systems in the building(s).

B. The work included in this Section consists of furnishing labor, instruments, and tools required in testing, adjusting and balancing the HVAC systems as described in these specifications or shown on accompanying drawings. Services shall include checking equipment performance, taking the specified measurements, and recording and reporting the results. The testing, adjusting and balancing agency shall act as a reporting agency; that is, list and report each piece of equipment as to identification number, manufacturer, model number, serial number, proper location, specified performance, and report actual performance of all equipment as found during testing. The report is intended to be used during the life of the building as a ready reference indicating original conditions, equipment components, etc.

C. Representatives of the Test and Balance Company shall visit the job site during installation of the HVAC equipment, piping and ductwork as required.

D. Upon completion of the HVAC system installation, the Test and Balance Company shall perform all required testing and balancing with the full cooperation of the Contractor and his Sub-contractors. The Contractor shall make changes and/or adjustments to the HVAC system components that are required by the Test and Balance Company to accomplish proper balancing. The TAB agency shall not supply or install any materials or balancing devices such as pulleys, drives, belts, etc. All of this work is by the Contractor and shall be performed at no additional cost to the Owner.

E. The test and balance report complete with a summary page listing all deficiencies shall be submitted to the Contractor for review. If the Contractor agrees with the report, he shall sign it and return it to the TAB agency. The test and balance report must be complete and must be accepted by the Contractor prior to acceptance of the project. Any outstanding test and balance items shall be placed on the punch list and a monetary value shall be assigned to them.

F. After all deficiencies have been corrected, the Contractor shall sign the testing and balancing report, and the Test and Balance Company shall supply four (4) copies of the final and complete report to the Contractor for inclusion in the Operation and Maintenance Manuals.

G. The items requiring testing, adjusting, and balancing include (but are not restricted to) the following:

1. Air Systems:

    a. Air Handling Units, chilled water and split system

b. Exhaust Fans
c. Zone branch and main ducts
d. VRV Fan Coil Units
e. Diffusers, Registers, Grilles and Dampers
f. Coils (Air Temperatures)
g. Valves
h. Vibration Isolators

2. Hydronic Systems:

a. Chilled Water Systems
b. Heating Water Systems

1.3 DEFINITIONS, REFERENCES, STANDARDS

A. All work shall be in accordance with the latest edition of the Associated Air Balance Council (AABC) National Standards or the latest standards of the National Environmental Balancing Bureau (NEBB). If these contract documents set forth more stringent requirements than the AABC National Standards or the NEBB Standards, these contract documents shall prevail.

1.4 QUALIFICATIONS

A. Agency Qualifications: The TAB Agency shall be a current member of the AABC or the NEBB and must be in good standing with FP&C. A list of these firms shall be obtained from FP&C. Falsification of a TAB report shall be grounds for removal from the FP&C list and the firm's actions shall be reported to the appropriate certification agency. The contractor may use any FP&C approved TAB firm on a state project.

1.5 SUBMITTALS

A. Procedures and Agenda: The TAB agency shall submit the TAB Procedures and agenda proposed to be used.

B. Sample Forms: The TAB agency shall submit sample forms, which shall include the minimum data required by the AABC National Standards or the NEBB Standards.

1.6 TAB PREPARATION AND COORDINATION

A. Shop drawings, submittal data, up-to-date revisions, change orders, fan curves, pump curves and other data required for planning, preparation, and execution of the TAB work shall be provided when available and no later than 30 days after the Designer has returned the final approved submittal data to the Contractor.

B. System installation and equipment startup shall be complete prior to the TAB agency's being notified to begin.

C. The building control system (BMCS) contractor shall provide and install the control system, including all temperature, pressure and humidity sensors. These shall be calibrated for accurate control. If applicable, the BMCS contractor shall install all necessary computers and computer programs, and make these operational. Assistance shall be provided as required for reprogramming, coordination, and problem resolution.

D. All test points, balancing devices, identification tags, etc., shall be accessible and clear of insulation and other obstructions that would impede TAB procedures.

E. Qualified installation or startup personnel shall be readily available for the operation and adjustment of the systems. Assistance shall be provided as required for coordination and problem resolution.

1.7 REPORTS

A. Final TAB Report: The TAB Agency shall submit the final TAB report for review by the Contractor. On plans provided, all outlets, devices, HVAC equipment, etc., shall be identified (including manufacturer, model number, serial number, motor manufacturer, HP, drive type, fan and motor sheaves and belt number), along with a numbering system corresponding to report unit identification. The TAB agency shall submit an AABC "National Project Performance Guaranty" (or similar NEBB Guaranty) assuring that the project systems were tested, adjusted and balanced in accordance with the project specifications and AABC National Standards (or similar NEBB Standards). The Designer shall certify his approval on the Performance Guaranty.

1. Submit 4 copies of the Final TAB Report to the Contractor for inclusion in the Operation and Maintenance Manuals.

PART 2 - INSTRUMENTATION

2.1 GENERAL

A. All instruments used for measurements shall be accurate and calibrated. Calibration and maintenance of all instruments shall be in accordance with the requirements of AABC National Standards (or similar NEBB Standards).

PART 3 - EXECUTION

3.1 GENERAL

A. The specified systems shall be reviewed and inspected for conformance to design documents. Testing, adjusting and balancing on each identified system shall be performed. The accuracy of measurements shall be in accordance with AABC National Standards (or similar NEBB Standards). Adjustment tolerances shall be + or – 10 percent unless otherwise stated.

B. Equipment settings, including manual damper quadrant positions, valve indicators, fan speed control levers, and similar controls and devices shall be marked to show final settings.

C. All information necessary to complete a proper TAB project and report shall be per AABC or NEBB standards unless otherwise noted. The descriptions of work required, as listed in this section, are a guide to the minimum information needed.

D. TAB contractor shall cut insulation, ductwork and piping for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. Upon completion, patch insulation, ductwork and housings using materials identical to those removed. Seal insulation to reestablish integrity of the vapor barrier.

E. TAB work shall include additional inspection and adjustment of components during the season following the initial balance to include re-balance of any items influenced by seasonal changes or as directed by the Owner.

3.2 AIR SYSTEMS

A. The TAB agency shall verify that all ductwork, splinters, extractors, dampers, grilles, registers, and diffusers have been installed per design, are functional and set full open. Any leakage in the ductwork shall be repaired prior to the test. The TAB agency shall perform the following TAB procedures in accordance with the AABC National Standards or NEBB Standards:

1. For 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, and 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 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.
    d. Outside Air: Test and adjust the outside air on applicable equipment using a Pitot-tube traverse. If a 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 degrees Fahrenheit or use the difference between Pitot-tube traverses of the supply and return air ducts.
    e. Static Pressure: Test and record system static pressure, including the static pressure profile of each supply fan.

2. For exhaust 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, and compare data with the nameplate limits to ensure motor is not in or above the service factor.
    c. Pitot-Tube Traverse: Perform a Pitot-tube traverse of main exhaust ducts 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.
    d. Static Pressure: Test and record system static pressure, including the static pressure profile of each exhaust fan.

3. For zone, branch and main ducts:

    a. Adjust ducts to within design CFM requirements. As applicable, at least one zone balancing damper shall be completely open. Multi-diffuser branch ducts shall have at least one outlet or inlet volume damper completely open.

4. For VAV systems:

    a. Identify the type, location, and size of each terminal box. This information shall be recorded on terminal box data sheets.
    b. Test, adjust and record the maximum and minimum box air quantities for each VAV box.
    c. Set volume regulators on all terminal boxes to meet design maximum and minimum CFM requirements.

d. Test and record entering and leaving air temperature of hot water coils with full heating air flow and water flow.
e. Insure the entering static pressure is sufficient for normal, proper box operation.

5. For diffusers, registers and grilles:

a. Tolerances: Test, adjust, and balance each diffuser, grille, and register to within 10 percent of design requirements. Minimize drafts. Include required CFM, initial test CFM and final CFM.
b. Identification: Identify the type, location, and size of each grille, diffuser, and register. This information shall be recorded on air outlet data sheets.

6. For coils:

a. Air Temperature: Once air flows are set to acceptable limits, take wet bulb and dry bulb air temperatures on the entering and leaving side of each cooling coil. Dry-bulb temperature shall be taken on the entering and leaving side of each heating coil.

3.3 HYDRONIC SYSTEMS

A. The TAB agency shall, as applicable, verify that all hydronic equipment, piping, and coils have been filled and purged; that strainers have been cleaned; and that all balancing valves (except bypass valves) are set full open. Examine water in system and determine if it has been treated and cleaned. As applicable, it shall check air vents and expansion or compression tank for proper operation. The TAB agency shall perform the following testing and balancing functions in accordance with the AABC National Standards (or similar NEBB Standards):

1. For system mains and branches:

a. Adjust water flow in pipes to within design GPM requirements. As applicable, at least one branch balancing valve shall be completely open.

3.4 VIBRATION TESTING

A. The TAB agency shall conduct vibration testing on the following equipment per AABC National Standards (or similar NEBB Standards). Test deflection in mils and velocity in inches per second shall be measured and the results compared to requirements in equipment specification sections.

1. Equipment: Air handling units.

3.5 ADDITIONAL TAB SERVICES

A. Job Site Inspections: During construction, the TAB agency shall inspect the installation of pipe systems, sheet metal work, temperature controls, and other component parts of the HVAC systems as required.

B. Verification of HVAC Controls: The TAB agency shall be assisted by the building control systems Contractor in verifying the operation and calibration of all HVAC and temperature control systems. The following tests shall be conducted:

1. Verify that all control components are installed in accordance with project requirements and are functional, including all electrical interlocks, damper sequences, air and water resets, fire and freeze stats, and other safety devices.

2. Verify that all controlling instruments are calibrated and set for design operating conditions.

C. Temperature Testing: To verify system control and operation, a series of three temperature tests shall be taken at approximately two-hour intervals in each separately controlled zone. The resulting temperatures shall not vary more than two degrees Fahrenheit from the thermostat or control set point during the tests. Outside temperature and humidity shall also be recorded during the testing periods.

D. TAB Report Verification: At the time of final inspection, the TAB agency may be required to recheck, in the presence of the owner's representative, specific and random selections of data, air quantities, and air motion recorded in the certified report. Points and areas for recheck shall be selected by the owner's representative. Measurements and test procedures shall be the same as approved for the initial work for the certified report. Selections for recheck, specific plus random, will not exceed 10 percent of the total number tabulated in the report.

E. Fire Testing: The Contractor shall test fire dampers in the presence of the TAB agency to assure proper operation. They shall verify that an access door has been installed for each fire damper. For each fire damper, the Contractor shall open the access door, disconnect the fusible link, and allow the damper to close. Operation should be smooth and the damper must close completely. The Contractor shall then reset the damper. For each smoke damper, the Contractor shall open the access door, activate the damper, and observe operation. The damper must close quickly and completely. The Contractor shall then reset the damper and observe its complete opening.

END OF SECTION 23 05 93

SECTION 23 07 13

DUCT INSULATION

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 semi-rigid and flexible duct, and plenum insulation; insulating cements; accessories and attachments; and sealing compounds.

B. Related Sections include the following:

1. Division 22 - Section 22 07 19, "Pipe Insulation for Plumbing and HVAC and Plumbing," for insulation for piping systems.

1.3 SUBMITTALS

A. Product Data: Identify thermal conductivity, thickness, and jackets (both factory and field applied, if any), for each type of product indicated.

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: As determined by testing materials identical to those specified in this Section according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and sealer and cement material containers with appropriate markings of applicable testing and inspecting agency.

B. Insulation Installed Indoors: Flame-spread rating of 25 or less, and smoke-developed rating of 50 or less.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Ship insulation materials in containers marked by manufacturer with appropriate ASTM specification designation, type and grade, and maximum use temperature.

1.6 COORDINATION

A. Coordinate clearance requirements with duct Installer for insulation application.

1.7 SCHEDULING

A. Schedule insulation application after testing duct systems. Insulation application may begin on segments of ducts that have satisfactory test results.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Mineral-Fiber Insulation:

    a. CertainTeed Manson.
    b. Knauf FiberGlass GmbH.
    c. Owens-Corning Fiberglas Corp.

2.2 INSULATION MATERIALS

A. Mineral-Fiber Board Thermal Insulation: Glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IB, without facing and with all-service jacket manufactured from kraft paper, reinforcing scrim, aluminum foil, and vinyl film.

B. Mineral-Fiber Blanket Thermal Insulation: Glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II, without facing and with all-service jacket manufactured from kraft paper, reinforcing scrim, aluminum foil, and vinyl film.

2.3 ACCESSORIES AND ATTACHMENTS

A. Weld-Attached Anchor Pins and Washers: Copper-coated steel pin for capacitor-discharge welding and galvanized speed washer. Pin length sufficient for insulation thickness indicated.

1. Welded Pin Holding Capacity: 100 lb (45 kg) for direct pull perpendicular to the attached surface.

B. Adhesive-Attached Anchor Pins and Speed Washers: Galvanized steel plate, pin, and washer manufactured for attachment to duct and plenum with adhesive. Pin length sufficient for insulation thickness indicated.

1. Adhesive: Recommended by the anchor pin manufacturer as appropriate for surface temperatures of ducts, plenums, and breechings; and to achieve a holding capacity of 100 lb (45 kg) for direct pull perpendicular to the adhered surface.

C. Self-Adhesive Anchor Pins and Speed Washers: Galvanized steel plate, pin, and washer manufactured for attachment to duct and plenum with adhesive. Pin length sufficient for insulation thickness indicated.

2.4 VAPOR RETARDERS

A. Mastics: Materials recommended by insulation material manufacturer that are compatible with insulation materials, jackets, and substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL APPLICATION REQUIREMENTS

A. Apply insulation materials, accessories, and finishes according to the manufacturer's written instructions; with smooth, straight, and even surfaces; and free of voids throughout the length of ducts and fittings.

B. Refer to schedules at the end of this Section for materials, forms, jackets, and thicknesses required for each duct system.

C. Use accessories compatible with insulation materials and suitable for the service. Use accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Seal joints and seams with vapor-retarder mastic on insulation indicated to receive a vapor retarder.

E. Keep insulation materials dry during application and finishing.

F. Apply insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by the insulation material manufacturer.

G. Apply insulation with the least number of joints practical.

H. Apply insulation over fittings and specialties, with continuous thermal and vapor-retarder integrity, unless otherwise indicated.

I. Hangers and Anchors: Where vapor retarder is indicated, seal penetrations in insulation at hangers, supports, anchors, and other projections with vapor-retarder mastic. Apply insulation continuously through hangers and around anchor attachments.

J. Insulation Terminations: For insulation application where vapor retarders are indicated, seal ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.

K. Apply insulation with integral jackets as follows:

1. Pull jacket tight and smooth.
2. Joints and Seams: Cover with tape and vapor retarder as recommended by insulation material manufacturer to maintain vapor seal.
3. Vapor-Retarder Mastics: Where vapor retarders are indicated, apply mastic on seams and joints and at ends adjacent to duct flanges and fittings.

L. Cut insulation according to manufacturer's written instructions to prevent compressing insulation to less than 75 percent of its nominal thickness.

M. Install vapor-retarder mastic on ducts and plenums scheduled to receive vapor retarders.

1. Ducts with Vapor Retarders: Overlap insulation facing at seams and seal with vapor-retarder mastic and pressure-sensitive tape having same facing as insulation. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-retarder seal.
2. Ducts without Vapor Retarders: Overlap insulation facing at seams and secure with outward clinching staples and pressure-sensitive tape having same facing as insulation.

N. Interior Wall and Partition Penetrations: Apply insulation continuously through walls and partitions.

3.4 MINERAL-FIBER INSULATION APPLICATION

A. Blanket Applications for Ducts and Plenums: Secure blanket insulation with anchor pins and speed washers.

1. Install anchor pins and speed washers on sides and bottom of horizontal ducts and sides of vertical ducts as follows:

    a. On the underside of ducts over 24 inches wide spaced 3 inches maximum from the butt joint.
    b. Do not over-compress insulation during installation.

2. Impale insulation over anchors and attach speed washers.
3. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
4. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches (50 mm) from one edge and one end of insulation segment. Secure laps to adjacent insulation segment with 1/2 inch (13 mm) staples, 1 inch (25 mm) o.c., and cover with pressure-sensitive tape having same facing as insulation.
5. Overlap unfaced blankets a minimum of 2 inches (50 mm) on longitudinal seams and end joints. Secure with steel band at end joints and spaced a maximum of 18 inches (450 mm) o.c.
6. Apply insulation on rectangular duct elbows and transitions with a full insulation segment for each surface. Apply insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
7. Insulate duct stiffeners, hangers, and flanges that protrude beyond the insulation surface with 6 inch (150 mm) wide strips of the same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with anchor pins spaced 6 inches (150 mm) o.c.
8. Apply vapor-retarder mastic to open joints, breaks, and punctures for insulation indicated to receive vapor retarder.

B. Board Applications for Ducts and Plenums: Secure board insulation with adhesive and anchor pins and speed washers.

1. Apply adhesive according to manufacturer's recommended coverage rates per square foot, spotted to assist installation.
2. Space anchor pins as required to secure insulation starting 3 inches maximum from the butt joints.
3. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
4. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches (50 mm) from one edge and one end of insulation segment. Secure laps to adjacent insulation segment with 1/2 inch (13 mm) staples, 1 inch (25 mm) o.c., and cover with pressure-sensitive tape having same facing as insulation.
5. Apply insulation on rectangular duct elbows and transitions with a full insulation segment for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Apply insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
6. Insulate duct stiffeners, hangers, and flanges that protrude beyond the insulation surface with 6 inch (150 mm) wide strips of the same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with anchor pins spaced 6 inches (150 mm) o.c.
7. Apply vapor-retarder mastic to open joints, breaks, and punctures for insulation indicated to receive vapor retarder.

3.5 DUCT SYSTEM APPLICATIONS

A. Insulation materials and thicknesses are specified in schedules at the end of this Section.

B. Materials and thicknesses for systems listed below are specified in Schedules at the end of this Section.

C. Insulate the following plenums and duct systems:

1. Indoor concealed supply-, return-, and outside-air ductwork.
2. Indoor exposed supply-, return-, and outside-air ductwork.

3.6 INDOOR DUCT AND PLENUM APPLICATION SCHEDULE

A. Service: Supply-air, return-air, and outside-air ducts, concealed.

1. Material: Mineral-fiber blanket.
2. Thickness: 2 inches (50 mm).
3. Number of Layers: One.
4. Vapor Retarder Required: Yes.

B. Service: Supply-air, return-air, and outside-air ducts, exposed.

1. Material: Mineral-fiber board.
2. Thickness: 1-1/2 inch.
3. Number of Layers: One.
4. Vapor Retarder Required: Yes.

END OF SECTION 23 07 13

SECTION 23 17 16

CONDENSATE DRAIN PIPING

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 piping for drain lines and condensate drain piping.

B. Related Sections include the following:

1. Division 22 Section 22 01 00, "Basic Mechanical Materials and Methods for Plumbing and HVAC," for general piping materials and installation requirements.
2. Division 22 Section 22 05 00, "Hangers and Supports for Plumbing and HVAC," for pipe supports, product descriptions, and installation requirements. Hanger and support spacing is specified in this Section.

1.3 COORDINATION

A. Coordinate layout and installation of drain piping and suspension system components with other construction, including natural gas piping system.

B. Coordinate piping installation with roof curbs, equipment supports, and roof penetrations.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. General: Refer to Piping and Fitting Material Schedule on the Drawings for applications of pipe and fitting materials.

PART 3 - EXECUTION

3.1 PIPING INSTALLATIONS

A. Refer to Division 22 Section 22 01 00, "Basic Mechanical Materials and Methods for Plumbing and HVAC," for basic piping installation requirements.

B. Install drains, consisting of a tee fitting, threaded nipple with threaded cap for system cleanout. Provide cleanout at each change in direction and at connection to unit.

C. Install piping at a uniform grade of 0.2 percent downward in direction of flow.

D. Increase/reduce pipe sizes using eccentric reducer fitting installed with level side down.

E. Unless otherwise indicated, install branch connections to mains using tee fittings in main pipe.

3.2 HANGERS AND SUPPORTS

A. Supports are specified in Division 22 Section 22 05 00, "Hangers and Supports for Plumbing and HVAC."

B. Install supports for steel piping with the following maximum spacing and with continuous slope from unit connection to drain line termination.

1. NPS 3/4 (DN 20): Maximum span, 5 feet (1.5 meters).
2. NPS 1 (DN 25): Maximum span, 6 feet (1.8 meters).
3. NPS 1-1/2 (DN 40): Maximum span, 8 feet (2.4 meters).
4. NPS 2 (DN 50): Maximum span, 8 feet (2.4 meters).
5. NPS 2-1/2 (DN 65): Maximum span, 9 feet (2.7 meters).
6. NPS 3 (DN 80): Maximum span, 10 feet (3 meters).

3.3 PIPE JOINT CONSTRUCTION

A. Refer to Division 22 Section 22 01 00, "Basic Mechanical Materials and Methods for Plumbing and HVAC," and schedule on the Drawings for joint construction requirements for soldered and brazed joints in copper tubing.

3.4 TERMINAL EQUIPMENT CONNECTIONS

A. Size for piping connections shall be same as for equipment connections. Increase pipe size at connection as indicated on Drawings.

3.5 CLEANING

A. Flush drain piping systems with clean water.

END OF SECTION 23 17 16

SECTION 23 21 13
HYDRONIC PIPING

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 piping, special-duty valves, and hydronic specialties for hot-water heating and chilled-water cooling; makeup water for these systems; and blowdown drain lines; and condensate drain piping.

B. Related Sections include the following:

1. Division 22 Section 22 01 00, "Basic Mechanical Materials and Methods," for general piping materials and installation requirements.
2. Division 22 Section 22 05 00, "Hangers and Supports," for pipe supports, product descriptions, and installation requirements.
3. Division 22 Section 22 05 53, "Mechanical Identification," for labeling and identifying hydronic piping.

1.3 SUBMITTALS

A. Product Data: For each type of hydronic specialty.

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

C. Field Test Reports: Written reports of tests specified in Part 3 of this Section. Include the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Failed test results and corrective action taken to achieve requirements.

D. Maintenance Data: For hydronic specialties and special-duty valves to include in maintenance manuals specified in Division 1.

1.4 QUALITY ASSURANCE

A. Welding: Qualify processes and operators according to the ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

B. ASME Compliance: Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation. Safety valves and pressure vessels shall bear the appropriate ASME label. Fabricate and stamp air separators and expansion tanks to comply with the ASME Boiler and Pressure Vessel Code, Section VIII, Division 1.

1.5 COORDINATION

A. Coordinate layout and installation of hydronic piping and suspension system components with HVAC equipment and existing construction.

B. Coordinate pipe fitting pressure classes with products specified in related Sections.

C. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into base. Concrete, reinforcement, and formwork requirements are specified in Division 3 Sections.

D. Coordinate installation of pipe sleeves for penetrations through floor assemblies.

PART 2 - PRODUCTS

2.1 BASIC IDENTIFICATION

A. General: Provide identification complying with Division 22 Section 22 05 53, "Mechanical Identification," in accordance with the following listing:
   1. Piping: Plastic pipe markers.
   2. Valves: Plastic valve tags.

2.2 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved equivalent:
   1. Calibrated Balancing Valves:
      a. Armstrong Pumps, Inc., CBV Series.
      b. Flow Design, Inc., Model AS.
      c. ITT Bell & Gossett; ITT Fluid Technology Corp., CB Series.
      d. Taco, Inc., CS Series.
      e. Wheatley, BV Series.

2.3 PIPING MATERIALS

A. General: Comply with the Piping Material Schedule on the Drawings for product requirements of piping materials. For each system, provide the piping materials indicated including pipe, tube, fittings, hangers, supports, anchors, valves, and accessories. Where more than one type is indicated, selection is Installer's option. Provide materials and equipment indicated and as required for complete and functioning systems. Where type is not indicated, provide materials and equipment to comply with function and operation requirements.

2.4 VALVES

A. Calibrated Balancing Valves, NPS 2 (DN 50) and Smaller: Bronze body, ball type, 125 psig (860 kPa) working pressure, 250 degrees F (121 degrees C) maximum operating temperature, and having threaded ends. Valves shall have calibrated orifice or venturi, connections for portable differential pressure meter with integral seals, and be equipped with a memory stop to retain set position.

2.5 HYDRONIC SPECIALTIES

A. Manual Air Vent: Bronze body and nonferrous internal parts; 150 psig (1035 kPa) working pressure; 225 degrees F (107 degrees C) operating temperature; manually operated with screwdriver or thumbscrew; with NPS 1/8 (DN 6) discharge connection and NPS 1/2 (DN 15) inlet connection.

B. Automatic Air Vent: Designed to vent automatically with float principle; bronze body and nonferrous internal parts; 150 psig (1035 kPa) working pressure; 240 degrees F (116 degrees C) operating temperature; with NPS 1/4 (DN 8) discharge connection and NPS 1/2 (DN 15) inlet connection.

C. Y-Pattern Strainers: 125 psig (860 kPa) working pressure; cast-iron body, flanged ends for NPS 2-1/2 (DN 65) and larger, threaded connections for NPS 2 (DN 50) and smaller, bolted cover, perforated stainless-steel basket, and bottom drain connection.

PART 3 - EXECUTION

3.1 INSTALLATION OF BASIC IDENTIFICATION

A. General: Install mechanical identification in accordance with Division 22 Section 22 05 53, "Mechanical Identification."

3.2 VALVE APPLICATIONS

A. General-Duty Valve Applications: Unless otherwise indicated, use the following valve types:
   1. Shutoff Duty: Gate valves.
   2. Throttling Duty: Globe valves.

B. Install shutoff duty valves at each branch connection to supply mains, at supply connection to each piece of equipment, unless only one piece of equipment is connected in the branch line. Install throttling duty valves at each branch connection to return mains, at return connections to each piece of equipment, and elsewhere as indicated.

C. Install calibrated balancing valves in the return water line of each heating or cooling element and elsewhere as required to facilitate system balancing.

3.3 PIPING INSTALLATIONS

A. Refer to Division 23 Section 23 00 00, "Basic Mechanical Materials and Methods," for basic piping installation requirements.

B. Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.

C. Install drains, consisting of a tee fitting, NPS 3/4 (DN 20) ball valve, and short NPS 3/4 (DN 20) threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.

D. Install piping at a uniform grade of 0.2 percent upward in direction of flow.

E. Reduce pipe sizes using eccentric reducer fitting installed with level side up.

F. Unless otherwise indicated, install branch connections to mains using tee fittings in main pipe, with the takeoff coming out the bottom of the main pipe. For up-feed risers, install the takeoff coming out the top of the main pipe.

G. Install strainers on supply side of each control valve, pressure-reducing valve, solenoid valve, pump, and elsewhere as indicated. Install NPS 3/4 (DN 20) nipple and ball valve in blowdown connection of strainers NPS 2 (DN 50) and larger. Match size of strainer blowoff connection for strainers smaller than NPS 2 (DN 50).

3.4 HANGERS AND SUPPORTS

A. Hanger, support, and anchor devices are specified in Division 22 Section 22 05 29, "Hangers and Supports." Comply with requirements below for maximum spacing of supports. All hangers and supports shall be external of insulation.

B. Install hangers for steel piping with the following maximum spacing and minimum rod sizes:
   1. NPS 3/4 (DN 20): Maximum span, 7 feet (2.1 meters); minimum rod size, 1/4 inch (6.4 mm).
   2. NPS 1 (DN 25): Maximum span, 7 feet (2.1 meters); minimum rod size, 1/4 inch (6.4 mm).
   3. NPS 1-1/2 (DN 40): Maximum span, 9 feet (2.7 meters); minimum rod size, 3/8 inch (10 mm).
   4. NPS 2 (DN 50): Maximum span, 10 feet (3 meters); minimum rod size, 3/8 inch (10 mm).
   5. NPS 2-1/2 (DN 65): Maximum span, 11 feet (3.4 meters); minimum rod size, 3/8 inch (10 mm).
   6. NPS 3 (DN 80): Maximum span, 12 feet (3.7 meters); minimum rod size, 3/8 inch (10 mm).
   7. NPS 4 (DN 100): Maximum span, 14 feet (4.3 meters); minimum rod size, 1/2 inch (13 mm).
   8. NPS 6 (DN 150): Maximum span, 17 feet (5.2 meters); minimum rod size, 1/2 inch (13 mm).
   9. NPS 8 (DN 200): Maximum span, 19 feet (5.8 meters); minimum rod size, 5/8 inch (16 mm).
   10. NPS 10 (DN 250): Maximum span, 20 feet (6.1 meters); minimum rod size, 3/4 inch (19 mm).

11. NPS 12 (DN 300): Maximum span, 23 feet (7 meters); minimum rod size, 7/8 inch (22 mm).

C. Support vertical runs at roof and at each floor.

3.5 PIPE JOINT CONSTRUCTION

A. Refer to Division 22 Section 22 01 00, "Basic Mechanical Materials and Methods," for joint construction requirements for threaded, welded, and flanged joints in steel piping.

3.6 HYDRONIC SPECIALTIES INSTALLATION

A. Install manual air vents at high points in piping, at heat-transfer coils, and elsewhere as required for system air venting.

B. Install automatic air vents in mechanical equipment rooms only at high points of system piping, at heat-transfer coils, and elsewhere as required for system air venting.

3.7 TERMINAL EQUIPMENT CONNECTIONS

A. Size for supply and return piping connections shall be same as for equipment connections.

B. Install control valves in accessible locations close to connected equipment.

C. Install bypass piping with globe valve around control valve. If multiple, parallel control valves are installed, only one bypass is required.

D. Install ports for pressure and temperature gages at coil inlet connections.

3.8 FIELD QUALITY CONTROL

A. Prepare hydronic piping according to ASME B31.9 and as follows:

1. Leave joints, including welds, uninsulated and exposed for examination during test.
2. Provide temporary restraints for expansion joints that cannot sustain reactions due to test pressure. If temporary restraints are impractical, isolate expansion joints from testing.
3. Flush system with clean water. Clean strainers.
4. Isolate equipment from piping. If a valve is used to isolate equipment, its closure shall be capable of sealing against test pressure without damage to valve. Install blinds in flanged joints to isolate equipment.
5. Install safety valve, set at a pressure no more than one-third higher than test pressure, to protect against damage by expanding liquid or other source of overpressure during test.

B. Perform the following tests on hydronic piping:

1. Use ambient temperature water as a testing medium unless there is risk of damage due to freezing. Another liquid that is safe for workers and compatible with piping may be used.
2. While filling system, use vents installed at high points of system to release trapped air. Use drains installed at low points for complete draining of liquid.
3. Check expansion tanks to determine that they are not air bound and that system is full of water.
4. Subject piping system to hydrostatic test pressure that is not less than 1.5 times the design pressure. Test pressure shall not exceed maximum pressure for any vessel, pump, valve, or other component in system under test. Verify that stress due to pressure at bottom of vertical runs does not exceed either 90 percent of specified minimum yield strength or 1.7 times "SE" value in Appendix A of ASME B31.9, "Building Services Piping."
5. After hydrostatic test pressure has been applied for at least 10 minutes, examine piping, joints, and connections for leakage. Eliminate leaks by tightening, repairing, or replacing components, and repeat hydrostatic test until there are no leaks.
6. Prepare written report of testing.

3.9 ADJUSTING

A. Mark calibrated nameplates of pump discharge valves after hydronic system balancing has been completed, to permanently indicate final balanced position.

B. Perform these adjustments before operating the system:

1. Open valves to fully open position. Close coil bypass valves.
2. Check pump for proper direction of rotation.
3. Set automatic fill valves for required system pressure.
4. Check air vents at high points of system and determine if all are installed and operating freely (automatic type), or bleed air completely (manual type).
5. Set temperature controls so all coils are calling for full flow.
6. Check operation of automatic bypass valves.
7. Check and set operating temperatures of converter to design requirements.
8. Lubricate motors and bearings.

3.10 CLEANING

A. Flush hydronic piping systems with clean water. Remove and clean or replace strainer screens. After cleaning and flushing hydronic piping systems, but before balancing, remove disposable fine-mesh strainers in pump suction diffusers.

END OF SECTION 23 21 13

SECTION 23 23 00

REFRIGERANT PIPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes refrigerant piping used for air-conditioning applications.

1.03 PERFORMANCE REQUIREMENTS

A. Line Test Pressure for Refrigerant R-410A:

1. Suction Lines for Air-Conditioning Applications: 300 psig (2068 kPa).
2. Suction Lines for Heat-Pump Applications: 535 psig (3689 kPa).
3. Hot-Gas and Liquid Lines: 535 psig (3689 kPa).

1.04 ACTION SUBMITTALS

A. Product Data: For each type of valve and refrigerant piping specialty indicated. Include pressure drop, based on manufacturer's test data, for the following:

1. Thermostatic expansion valves.
2. Solenoid valves.
3. Hot-gas bypass valves.
4. Filter dryers.
5. Strainers.
6. Pressure-regulating valves.

B. Shop Drawings: Show layout of refrigerant piping and specialties, including pipe, tube, and fitting sizes, flow capacities, valve arrangements and locations, slopes of horizontal runs, oil traps, double risers, wall and floor penetrations, and equipment connection details. Show interface and spatial relationships between piping and equipment.

1. Shop Drawing Scale: 1/4 inch equals 1 foot (1:50).
2. Refrigerant piping indicated on Drawings is schematic only. Size piping and design actual piping layout, including oil traps, double risers, specialties, and pipe and tube sizes to accommodate, as a minimum, equipment provided, elevation difference between compressor and evaporator, and length of piping to ensure proper operation and compliance with warranties of connected equipment.

1.05 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Field quality-control test reports.

C. Installer’s Certificate of Training from manufacturers of Sections 15700 equipment.

1.06 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For refrigerant valves and piping specialties to include in maintenance manuals.

1.07 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

B. Comply with ASHRAE 15, "Safety Code for Refrigeration Systems."

C. Comply with ASME B31.5, "Refrigeration Piping and Heat Transfer Components."

1.08 PRODUCT STORAGE AND HANDLING

A. Store piping in a clean and protected area with end caps in place to ensure that piping interior and exterior are clean when installed.

1.09 COORDINATION

A. Coordinate size and location of roof curbs, equipment supports, and roof penetrations. These items are specified in Section 07720 "Roof Accessories."

PART 2 - PRODUCTS

2.01 COPPER TUBE AND FITTINGS

A. Copper Tube: ASTM B 88, Type K or L.

B. Wrought-Copper Fittings: ASME B16.22.

C. Wrought-Copper Unions: ASME B16.22.

D. Solder Filler Metals: ASTM B 32. Use 95-5 tin antimony or alloy HB solder to join copper socket fittings on copper pipe.

E. Brazing Filler Metals: AWS A5.8.

F. Flexible Connectors:

1. Body: Tin-bronze bellows with woven, flexible, tinned-bronze-wire-reinforced protective jacket.
2. End Connections: Socket ends.
3. Offset Performance: Capable of minimum 3/4-inch (20-mm) misalignment in minimum 7-inch- (180-mm-) long assembly.
4. Pressure Rating: Factory test at minimum 500 psig (3450 kPa).
5. Maximum Operating Temperature: 250 deg F (121 deg C).

G. Flexible Connectors:

1. Body: Stainless-steel bellows with woven, flexible, stainless-steel-wire-reinforced protective jacket
2. End Connections:
   a. NPS 2 (DN 50) and Smaller: With threaded-end connections.

b. NPS 2-1/2 (DN 65) and Larger: With flanged-end connections.

3. Offset Performance: Capable of minimum 3/4-inch (20-mm) misalignment in minimum 7-inch- (180-mm-) long assembly.
4. Pressure Rating: Factory test at minimum 500 psig (3450 kPa).
5. Maximum Operating Temperature: 250 deg F (121 deg C).

2.02 VALVES AND SPECIALTIES

A. Service Valves:

1. Body: Forged brass with brass cap including key end to remove core.
2. Core: Removable ball-type check valve with stainless-steel spring.
3. Seat: Polytetrafluoroethylene.
4. End Connections: Copper spring.
5. Working Pressure Rating: 500 psig (3450 kPa).

B. Solenoid Valves: Comply with ARI 760 and UL 429; listed and labeled by an NRTL.

1. Body and Bonnet: Plated steel.
2. Solenoid Tube, Plunger, Closing Spring, and Seat Orifice: Stainless steel.
3. Seat: Polytetrafluoroethylene.
4. End Connections: Threaded.
5. Electrical: Molded, watertight coil in NEMA 250 enclosure of type required by location with 1/2-inch (16-GRC) conduit adapter, and 24-V ac coil.
6. Working Pressure Rating: 400 psig (2760 kPa).
7. Maximum Operating Temperature: 240 deg F (116 deg C).
8. Manual operator.

C. Straight-Type Strainers:

1. Body: Welded steel with corrosion-resistant coating.
2. Screen: 100-mesh stainless steel.
3. End Connections: Socket or flare.
4. Working Pressure Rating: 500 psig (3450 kPa).
5. Maximum Operating Temperature: 275 deg F (135 deg C).

D. Moisture/Liquid Indicators:

1. Body: Forged brass.
2. Window: Replaceable, clear, fused glass window with indicating element protected by filter screen.
3. Indicator: Color coded to show moisture content in ppm.
4. Minimum Moisture Indicator Sensitivity: Indicate moisture above 60 ppm.
5. End Connections: Socket or flare.
6. Working Pressure Rating: 500 psig (3450 kPa).
7. Maximum Operating Temperature: 240 deg F (116 deg C).

E. Replaceable-Core Filter Dryers: Comply with ARI 730.

1. Body and Cover: Painted-steel shell with ductile-iron cover, stainless-steel screws, and neoprene gaskets.
2. Filter Media: 10 micron, pleated with integral end rings; stainless-steel support.
3. Desiccant Media: Activated alumina.
4. Designed for reverse flow (for heat-pump applications).
5. End Connections: Socket.

6. Access Ports: NPS 1/4 (DN 8) connections at entering and leaving sides for pressure differential measurement.
7. Maximum Pressure Loss: 2 psig (14 kPa).
8. Working Pressure Rating: 500 psig (3450 kPa).
9. Maximum Operating Temperature: 240 deg F (116 deg C).
10. Locking mechanism to prevent huffing.

2.03 REFRIGERANTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Atofina Chemicals, Inc.
2. DuPont Company; Fluorochemicals Div.
3. Honeywell, Inc.; Genetron Refrigerants.
4. INEOS Fluor Americas LLC.

B. ASHRAE 34, R-410A: Pentafluoroethane/Difluoromethane.

PART 3 - EXECUTION

3.01 PIPING APPLICATIONS FOR REFRIGERANT R-410A

A. Suction Lines NPS 4 (DN 100) and Smaller for Conventional Air-Conditioning Applications: Copper, Type L, drawn-temper tubing and wrought-copper fittings with soldered joints.

B. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications: Copper, Type L, annealed- or drawn-temper tubing and wrought-copper fittings with brazed.

C. Safety-Relief-Valve Discharge Piping: Copper, Type L, annealed- or drawn-temper tubing and wrought-copper fittings with brazed joints.

3.02 VALVE AND SPECIALTY APPLICATIONS

A. Install service valves for gage taps at inlet and outlet of hot-gas bypass valves and strainers if they are not an integral part of valves and strainers.

B. Install solenoid valves upstream from each expansion valve and hot-gas bypass valve. Install solenoid valves in horizontal lines with coil at top.

C. Install thermostatic expansion valves as close as possible to distributors on evaporators.

1. Install valve so diaphragm case is warmer than bulb.
2. Secure bulb to clean, straight, horizontal section of suction line using two bulb straps. Do not mount bulb in a trap or at bottom of the line.
3. If external equalizer lines are required, make connection where it will reflect suction-line pressure at bulb location.

D. Install safety relief valves where required by ASME Boiler and Pressure Vessel Code. Pipe safety-relief-valve discharge line to outside according to ASHRAE 15.

E. Install moisture/liquid indicators in liquid line at the inlet of the thermostatic expansion valve or at the inlet of the evaporator coil capillary tube.

F. Install strainers upstream from and adjacent to the following unless they are furnished as an integral assembly for device being protected:

1. Solenoid valves.
2. Thermostatic expansion valves.
3. Hot-gas bypass valves.
4. Compressor.

G. Install filter dryers in liquid line between compressor and thermostatic expansion valve, and in the suction line at the compressor.

H. Install flexible connectors at compressors.

3.03 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems; indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.

B. Install refrigerant piping according to ASHRAE 15.

C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping adjacent to machines to allow service and maintenance.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Select system components with pressure rating equal to or greater than system operating pressure.

J. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.

K. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in Section 08311 "Access Doors and Frames" if valves or equipment requiring maintenance is concealed behind finished surfaces.

L. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.

M. Slope refrigerant piping as follows:

1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
2. Install horizontal suction lines with a uniform slope downward to compressor.
3. Install traps and double risers to entrain oil in vertical runs.
4. Liquid lines may be installed level.

N. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.

O. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.

P. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 15050 - Basic Mechanical Material and Methods.

3.04 PIPE JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Fill pipe and fittings with an inert gas (nitrogen or carbon dioxide), during brazing or welding, to prevent scale formation.

D. Soldered Joints: Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook."

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."

1. Use Type BcuP, copper-phosphorus alloy for joining copper socket fittings with copper pipe.
2. Use Type BAg, cadmium-free silver alloy for joining copper with bronze or steel.

F. Steel pipe can be threaded, but threaded joints must be seal brazed or seal welded.

G. Welded Joints: Construct joints according to AWS D10.12/D10.12M.

H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.05 HANGERS AND SUPPORTS

A. Hanger, support, and anchor products are specified in Section 15062 "Hangers and Supports for HVAC Piping and Equipment."

B. Install the following pipe attachments:

1. Adjustable steel clevis hangers for individual horizontal runs less than 20 feet (6 m) long.
2. Roller hangers and spring hangers for individual horizontal runs 20 feet (6 m) or longer.
3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet (6 m) or longer, supported on a trapeze.
4. Spring hangers to support vertical runs.
5. Copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.

C. Install hangers for copper tubing with the following maximum spacing and minimum rod sizes:

1. NPS 1/2 (DN 15): Maximum span, 60 inches (1500 mm); minimum rod size, 1/4 inch (6.4 mm).
2. NPS 5/8 (DN 18): Maximum span, 60 inches (1500 mm); minimum rod size, 1/4 inch (6.4 mm).
3. NPS 1 (DN 25): Maximum span, 72 inches (1800 mm); minimum rod size, 1/4 inch (6.4 mm).

4. NPS 1-1/4 (DN 32): Maximum span, 96 inches (2400 mm); minimum rod size, 3/8 inch (9.5 mm).
5. NPS 1-1/2 (DN 40): Maximum span, 96 inches (2400 mm); minimum rod size, 3/8 inch (9.5 mm).
6. NPS 2 (DN 50): Maximum span, 96 inches (2400 mm); minimum rod size, 3/8 inch (9.5 mm).
7. NPS 2-1/2 (DN 65): Maximum span, 108 inches (2700 mm); minimum rod size, 3/8 inch (9.5 mm).
8. NPS 3 (DN 80): Maximum span, 10 feet (3 m); minimum rod size, 3/8 inch (9.5 mm).
9. NPS 4 (DN 100): Maximum span, 12 feet (3.7 m); minimum rod size, 1/2 inch (13 mm).

D. Install hangers for steel piping with the following maximum spacing and minimum rod sizes:

1. NPS 2 (DN 50): Maximum span, 10 feet (3 m); minimum rod size, 3/8 inch (9.5 mm).
2. NPS 2-1/2 (DN 65): Maximum span, 11 feet (3.4 m); minimum rod size, 3/8 inch (9.5 mm).
3. NPS 3 (DN 80): Maximum span, 12 feet (3.7 m); minimum rod size, 3/8 inch (9.5 mm).
4. NPS 4 (DN 100): Maximum span, 14 feet (4.3 m); minimum rod size, 1/2 inch (13 mm).

E. Support multifloor vertical runs at least at each floor.

3.06 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections:

1. Comply with ASME B31.5, Chapter VI.
2. Test refrigerant piping, specialties, and receivers. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in Part 1 "Performance Requirements" Article.
    a. Fill system with nitrogen to the required test pressure.
    b. System shall maintain test pressure at the manifold gage throughout duration of test.
    c. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
    d. Remake leaking joints using new materials, and retest until satisfactory results are achieved.

3.07 SYSTEM CHARGING

A. Charge system using the following procedures:

1. Install core in filter dryers after leak test but before evacuation.
2. Evacuate entire refrigerant system with a vacuum pump to 500 micrometers (67 Pa). If vacuum holds for 12 hours, system is ready for charging.
3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig (14 kPa).
4. Charge system with a new filter-dryer core in charging line.

3.08 ADJUSTING

A. Adjust thermostatic expansion valve to obtain proper evaporator superheat.

B. Adjust high- and low-pressure switch settings to avoid short cycling in response to fluctuating suction pressure.

C. Adjust set-point temperature of air-conditioning or chilled-water controllers to the system design temperature.

D. Perform the following adjustments before operating the refrigeration system, according to manufacturer's written instructions:

1. Open shutoff valves in condenser water circuit.
2. Verify that compressor oil level is correct.
3. Open compressor suction and discharge valves.
4. Open refrigerant valves except bypass valves that are used for other purposes.
5. Check open compressor-motor alignment and verify lubrication for motors and bearings.

E. Replace core of replaceable filter dryer after system has been adjusted and after design flow rates and pressures are established.

END OF SECTION 23 23 00

SECTION 23 31 13

METAL DUCTS

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 metal ducts for supply, return, outside, and exhaust air-distribution systems in pressure classes from minus 1- to plus 2-inch wg (minus 500 to plus 2500 Pa). Metal ducts include the following:

1. Single-wall rectangular ducts and fittings.
2. Single-wall, round, longitudinal seams and fittings.

B. Related Sections include the following:

1. Division 23 Section 23 33 00, "Ductwork Accessories," for dampers, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.3 SYSTEM DESCRIPTION

A. Duct system design, as indicated, has been used to select size and type of air-moving and -distribution equipment and other air system components. Changes to layout or configuration of duct system must be specifically approved in writing by Architect. Accompany requests for layout modifications with calculations showing that proposed layout will provide original design results without increasing system total pressure.

1.4 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code–Steel," for hangers and supports and AWS D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

B. Codes and Standards:

1. SMACNA Standards: "HVAC Duct Construction Standards, Metal and Flexible."
2. International Mechanical Code.
3. International Building Code.

C. NFPA Compliance:

1. NFPA 90A, "Installation of Air Conditioning and Ventilating Systems."
2. NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

D. Comply with NFPA 96, "Ventilation Control and Fire Protection of Commercial Cooking Operations," for range hood ducts, unless otherwise indicated.

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS

A. Comply with SMACNA's, "HVAC Duct Construction Standards–Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods, unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Lock-forming quality; complying with ASTM A 653/A 653M and having G60 (Z180) coating designation; ducts shall have mill-phosphatized finish for surfaces exposed to view.

C. Carbon-Steel Sheets: ASTM A 366/A 366M, cold-rolled sheets; commercial quality; with oiled, matte finish for exposed ducts.

D. Stainless Steel: ASTM A 480/A 480M, Type 304, and having a No. 2D finish for concealed ducts and No. 7 for exposed ducts.

E. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts.

F. Tie Rods: Galvanized steel, 1/4 inch (6 mm) minimum diameter for lengths 36 inches (900 mm) or less; 3/8 inch (10 mm) minimum diameter for lengths longer than 36 inches (900 mm).

2.2 SEALANT MATERIALS

A. Joint and Seam Sealants, General: The term "sealant" is not limited to materials of adhesive or mastic nature but includes tapes and combinations of open-weave fabric strips and mastics.

B. Joint and Seam Tape: 2 inches (50 mm) wide; glass-fiber-reinforced fabric.

C. Flanged Joint Mastic: One-part, acid-curing, silicone, elastomeric joint sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use O.

D. Flange Gaskets: Butyl rubber or EPDM polymer with polyisobutylene plasticizer.

2.3 HANGERS AND SUPPORTS

A. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.

1. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches (100 mm) thick.
2. Exception: Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches (100 mm) thick.

B. Hanger Materials: Galvanized sheet steel or threaded steel rod.

1. Hangers Installed in Corrosive Atmospheres: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.
2. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards–Metal and Flexible" for steel sheet width and thickness and for steel rod diameters.
3. Galvanized-steel straps attached to aluminum ducts shall have contact surfaces painted with zinc-chromate primer.

C. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

D. Trapeze and Riser Supports: Steel shapes complying with ASTM A 36/A 36M.

1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
2. Supports for Stainless-Steel Ducts: Stainless-steel support materials.

2.4 RECTANGULAR DUCT FABRICATION

A. Fabricate ducts, elbows, joints, transitions, offsets, branch connections, and other construction according to SMACNA's, "HVAC Duct Construction Standards–Metal and Flexible" and complying with requirements for metal thickness, reinforcing types and intervals, tie-rod applications, and joint types and intervals.

1. Lengths: Fabricate rectangular ducts in lengths appropriate to reinforcement and rigidity class required for pressure class.
2. Deflection: Duct systems shall not exceed deflection limits according to SMACNA's "HVAC Duct Construction Standards–Metal and Flexible."

B. Cross Breaking or Cross Beading: Cross break or cross bead duct sides 19 inches (480 mm) and larger and 0.0359 inch (0.9 mm) thick or less, with more than 10 sq. ft. (0.93 sq. m) of nonbraced panel area unless ducts are lined.

2.5 ROUND DUCT AND FITTING FABRICATION

A. Round, Longitudinal-Seam Ducts: Fabricate supply ducts of galvanized steel according to SMACNA's, "HVAC Duct Construction Standards–Metal and Flexible."

PART 3 - EXECUTION

3.1 DUCT APPLICATIONS

A. Static-Pressure Classes: Unless otherwise indicated, construct ducts according to the following:

1. Supply Ducts: 2-inch wg (500 Pa).
2. Return Ducts (Negative Pressure): 1-inch wg (125 Pa).
3. Exhaust Ducts (Negative Pressure): 1-inch wg (1000 Pa).

B. All ducts shall be galvanized steel.

3.2 DUCT INSTALLATION

A. Construct and install ducts according to SMACNA's, "HVAC Duct Construction Standards–Metal and Flexible," unless otherwise indicated.

B. Install round ducts in lengths not less than 12 feet (3.7 meters) unless interrupted by fittings.

C. Install ducts with fewest possible joints.

D. Install fabricated fittings for changes in directions, size, and shape and for connections. Branch duct connections "tapped" into round mains will not be acceptable.

E. Install couplings tight to duct wall surface with a minimum of projections into duct. Secure couplings with sheet metal screws. Install screws at intervals of 12 inches (300 mm), with a minimum of 3 screws in each coupling.

F. Install ducts, unless otherwise indicated, vertically and horizontally and parallel and perpendicular to building lines; avoid diagonal runs unless indicated on the Drawings.

G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

H. Install ducts with a minimum clearance of 1 inch (25 mm), plus allowance for insulation thickness.

I. Conceal ducts from view in finished spaces. Do not encase horizontal runs in solid partitions unless specifically indicated.

J. Coordinate layout with suspended ceiling, fire- and smoke-control dampers, lighting layouts, and similar finished work.

K. Seal all joints and seams. Apply sealant to male end connectors before insertion, and afterward to cover entire joint and sheet metal screws.

L. Electrical Equipment Spaces: Route ducts to avoid passing through transformer vaults and electrical equipment spaces and enclosures. Route ducts to avoid passing over electrical panelboards and switchboards.

M. Non-Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls and are exposed to view, conceal spaces between construction openings and ducts or duct insulation with sheet metal flanges of same metal thickness as ducts. Overlap openings on 4 sides by at least 1-1/2 inches (38 mm).

N. Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls, install appropriately rated fire dampers, sleeves, and firestopping sealant. Fire and smoke dampers are specified in Division 23 Section 23 33 00, "Ductwork Accessories." Firestopping materials and installation methods are specified in Division 7 Section "Through-Penetration Firestop Systems."

O. Protect duct interiors from the elements and foreign materials until building is enclosed. Follow SMACNA's "Duct Cleanliness for New Construction."

P. All branch connections shall be provided with a volume control damper. Provide opposed blade or splitter damper as indicated at each branch duct connection for supply air, return air, outside air, and exhaust air. Provide opposed blade damper where damper is not indicated.

3.3 SEAM AND JOINT SEALING

A. Seal duct seams and joints according to SMACNA's, "HVAC Duct Construction Standards–Metal and Flexible" for duct pressure class indicated.

1. For pressure classes lower than 2-inch wg (500 Pa), seal transverse joints.

B. Seal ducts before external insulation is applied.

3.4 HANGING AND SUPPORTING

A. Support horizontal ducts within 24 inches (600 mm) of each elbow and within 48 inches (1200 mm) of each branch intersection.

B. Support vertical ducts at maximum intervals of 16 feet (5 meters) and at each floor.

C. Install upper attachments to structures with an allowable load not exceeding one-fourth of failure (proof-test) load.

D. Install concrete inserts before placing concrete.

E. Install powder-actuated concrete fasteners after concrete is placed and completely cured.

1. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches (100 mm) thick.

3.5 CONNECTIONS

A. Make connections to equipment with flexible connectors according to Division 23 Section 23 33 00, "Ductwork Accessories."

B. Comply with SMACNA's, "HVAC Duct Construction Standards–Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections according to SMACNA's, "HVAC Air Duct Leakage Test Manual" and prepare test reports:

1. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
2. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If pressure classes are not indicated, test entire system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure. Give seven days' advance notice for testing.
3. Maximum Allowable Leakage: Comply with requirements for Leakage Class 3 for round ducts, Leakage Class 12 for rectangular ducts in pressure classes lower than and equal to 2-inch wg (500 Pa) (both positive and negative pressures), and Leakage Class 6 for pressure classes from 2- to 10-inch wg (500 to 2500 Pa).
4. Remake leaking joints and retest until leakage is equal to or less than maximum allowable.

3.7 CLEANING NEW SYSTEMS

A. Mark position of dampers and air-directional mechanical devices before cleaning, and perform cleaning before air balancing.

B. Use service openings, as required, for physical and mechanical entry and for inspection.

1. Create other openings to comply with duct standards.
2. Disconnect flexible ducts as needed for cleaning and inspection.
3. Remove and reinstall ceiling sections to gain access during the cleaning process.

C. Vent vacuuming system to the outside. Include filtration to contain debris removed from HVAC systems, and locate exhaust down wind and away from air intakes and other points of entry into building.

D. Clean the following metal duct systems by removing surface contaminants and deposits:

1. Air outlets and inlets (registers, grilles, and diffusers).
2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.

3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
4. Coils and related components.
5. Return-air ducts, dampers, and actuators except in ceiling plenums and mechanical equipment rooms.
6. Supply-air ducts, dampers, actuators, and turning vanes.

E. Mechanical Cleaning Methodology:

1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
3. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.

F. Cleanliness Verification:

1. Visually inspect metal ducts for contaminants.
2. Where contaminants are discovered, re-clean and re-inspect ducts.

END OF SECTION 23 31 13

SECTION 23 33 00

DUCTWORK ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK

A. Extent of ductwork accessories work is indicated on drawings and in schedules and by requirements of this section.

B. Types of ductwork accessories required for project include the following:

1. Low pressure manual dampers.
2. Turning vanes.
3. Duct hardware.
4. Duct access doors.
5. Flexible connections.
6. Flexible ducts.

C. Refer to other Division 23 Sections for testing, adjusting, and balancing of ductwork accessories; not work of this section.

1.3 QUALITY ASSURANCE

A. Codes and Standards:

1. SMACNA Compliance: Comply with applicable portions of SMACNA "HVAC Duct Construction Standards, Metal and Flexible."
2. NFPA Compliance: Comply with applicable provisions of NFPA 90A "Air Conditioning and Ventilating Systems" pertaining to installation of ductwork accessories.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's technical product data for each type of ductwork accessory, including dimensions, capacities, and materials of construction and installation instructions.

B. Maintenance Data: Submit manufacturer's maintenance data including parts lists for each type of duct accessory. Include this data and product data in maintenance manual; in accordance with requirements of Division 1 and Division 22 Section 22 05 00, "Basic Mechanical Materials and Methods for Plumbing and HVAC".

PART 2 - PRODUCTS

2.1 DAMPERS

A. Low Pressure Manual Dampers: Provide manual volume dampers constructed of galvanized steel.

1. Square and Rectangular Dampers: Dampers shall have minimum 16 gauge frames and minimum 16 gauge roll formed blades. Multi-blade dampers shall have interlocking

corrugated edges. Damper linkage shall be concealed in the damper frame. Dampers for ducts smaller than 10 inches by 10 inches may be single blade dampers, all other dampers shall have multiple blades. Provide opposed blade type unless indicated otherwise.

2. Round Dampers: Dampers shall be minimum 20 gauge frame and 20 gauge blade. Blade shall be secured to 3/8" square or 1/2" diameter galvanized or plated axle/shaft that extends beyond frame through bearings and locking hand quadrant.
3. Dampers shall include permanently lubricated oilite bronze bearings pressed securely into damper frame.
4. Dampers shall include factory furnished locking quadrants with 2" elevated dial and "OPEN" and "CLOSED" indicators.

B. Manufacturer: Subject to compliance with requirements, provide balancing dampers of one of the following or approved equivalent:

		Single Blade	Opposed Blade	Parallel Blade	Round Blade
1.	Ruskin	MD35	MD35	MD35	MDRS25
2.	Air Balance, Inc.	AC-1	AC-2	AC-1	AC-530
3.	Greenheck	MBD-15	MBD-15	MBD-15	MBDR-50
4.	American Warming and Ventilating	VC-1	VC-2	VC-2	VC-25
5.	Safe-Air	612	610	611	BDR
6.	PoHorf	CD10	CD425	CD10	CD10R
7.	Nailor	1870	1820	1810	1890
8.	NCA Manufacturing	MBD-57	MBD-57	MBD-57	MBD-RD-88

2.2 TURNING VANES

A. Fabricated Turning Vanes: Provide fabricated turning vanes and vane runners, constructed in accordance with SMACNA "HVAC Duct Construction Standards".

2.3 DUCT HARDWARE

A. General: Provide duct hardware, manufactured by one manufacturer for all items on project, for the following:

1. Test Holes: Provide in ductwork at fan inlet and outlet and elsewhere as indicated, duct test holes, consisting of slot and cover, for instrument tests.
2. Quadrant Locks: Provide quadrant lock device on one end of shaft and end bearing plate on other end for damper lengths over 12". Provide 2" extended quadrant locks and 2" end extended bearing plates for externally insulated ductwork.

    1) Duro-dyne, Model 8021.
    2) Young, Model 443B/404B.

3. Concealed dampers that are not accessible shall be controlled by a concealed regulator, type as indicated. Where type is not indicated, provide type as recommended by manufacturer for application. Include flush chrome plated access panel for each.

    1) Duro-dyne, Model 8009.
    2) Young, Model 301/315.

B. Spin-In Fittings:

1. Flexmaster U.S.A., Inc., Model CB.
2. Sheet Metal Connectors, Inc., Model G.
3. M & M Manufacturing, Model 50.

C. High Efficiency Takeoffs (Rectangular Tap with Transition to Round Branch):

1. Sheet Metal Connectors, Inc., Model HET (24 gage.).
2. Field fabricated as detailed on the drawings.
3. Dace, Model STO.

2.4 DUCT ACCESS DOORS

A. General: Provide where indicated, duct access doors of size indicated.

B. Construction: Construct of same or greater gage as ductwork served; provide insulated doors for insulated ductwork with minimum 1 inch insulation (k-valve = 0.26 at 75 degrees F mean temperature sandwiched between sheetmetal panels. Provide flush frames for uninsulated ductwork; extended frames for externally insulated duct. Provide one side hinged, other side with one handle-type latch for doors 12 inches high and smaller, 2 handle-type latches for larger doors. Screwdriver operated latches are not acceptable

2.5 FLEXIBLE CONNECTIONS

A. Provide flexible duct connections wherever ductwork connects to HVAC equipment, fans or other vibration isolated equipment. Construct flexible connections of neoprene-coated flameproof fabric crimped into duct flanges for attachment to duct and equipment. Make airtight joint. Provide adequate joint flexibility to allow for thermal, axial, transverse, and torsional movement, and also capable of absorbing vibrations of connected equipment.

2.6 FLEXIBLE DUCTS

A. Manufacturers:

1. Flexmaster U.S.A., Inc.
2. Hart & Cooley, Inc.
3. McGill AirFlow Corporation.
4. Thermaflex.

B. Insulated-Duct Connectors: UL 181, Class 1, liner of multiple layers of aluminum laminate supported by helically wound, galvanized or coated spring-steel wire; fibrous-glass insulation; aluminized vapor barrier film.

1. Pressure Rating: 10-inch wg (2500 Pa) positive and 1.0-inch wg (250 Pa) negative.
2. Rated Air Velocity: 4000 fpm (20.3 m/s).
3. Temperature Range: Minus 20 to plus 210 degrees F (Minus 28 to plus 99 degrees C).
4. Flame Spread: Less than 25.
5. Smoke Developed: Less than 50.
6. Thermal Conductance: C Factor not more than 0.23.

C. Flexible Duct Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action, in sizes to suit duct size.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine areas and conditions under which ductwork accessories will be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 INSTALLATION OF DUCTWORK ACCESSORIES

A. Install ductwork accessories in accordance with manufacturer's installation instructions, with applicable portions of details of construction as shown in SMACNA standards, and in accordance with recognized industry practices to ensure that products serve intended function.

B. Where ducts take off mains, and where ducts divide, install splitter dampers or volume dampers, each with adjustable locking quadrant control. Provide volume damper unless splitter damper is indicated. Provide adjustable pivoting splitter with locking quadrant control for all splitter dampers. Provide a volume damper after each splitter damper, located in the branch with the lowest resistance.

C. Concealed dampers that are not accessible shall be controlled by a concealed regulator, type as indicated. Where type is not indicated, provide type as recommended by manufacturer for application. Include flush chrome plated access panel for each.

D. Install turning vanes in all square or rectangular 90° elbows in supply, return, and exhaust air systems, and elsewhere as indicated.

E. Install access doors to open against system air pressure, with latches operable from either side.

F. Install flexible ducts only where indicated and only in extended straight lengths not to exceed 36 inches; bends, sags or elbows will not be permitted.

G. Coordinate with other work, including ductwork, as necessary to interface installation of ductwork accessories properly with other work.

3.3 FIELD QUALITY CONTROL

A. Operate installed ductwork accessories to demonstrate compliance with requirements. Test for air leakage while system is operating. Repair or replace faulty accessories, as required to obtain proper operation and leak proof performance.

3.4 ADJUSTING AND CLEANING

A. Adjusting: Adjust ductwork accessories for proper settings, install fusible links in fire dampers, and adjust for proper action.

B. Final positioning of manual dampers is specified in Section 23 05 93 “Test, Adjust, and Balance".

C. Cleaning: Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.

END OF SECTION 23 33 00

SECTION 23 34 23

POWER VENTILATORS

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:

1. Ceiling-mounting ventilators

1.3 SUBMITTALS

A. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated and include the following:

1. Certified fan performance curves with system operating conditions indicated.
2. Certified fan sound-power ratings.
3. Motor ratings and electrical characteristics, plus motor and electrical accessories.
4. Dampers, including housings, linkages, and operators.

B. Maintenance Data: For power ventilators to include in maintenance manuals specified in Division 1.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. AMCA Compliance: Products shall comply with performance requirements and shall be licensed to use the AMCA-Certified Ratings Seal.

C. NEMA Compliance: Motors and electrical accessories shall comply with NEMA standards.

D. UL Standard: Power ventilators shall comply with UL 705.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver fans as factory-assembled unit, to the extent allowable by shipping limitations, with protective crating and covering.

1.6 COORDINATION

A. Coordinate size and location of structural-steel support members.

B. Coordinate installation of roof curbs, equipment supports, and roof penetrations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Ceiling-Mounting Ventilators:

a. Cook, Model GC
b. Greenheck, Model SP.
c. Twin City, Model TL

2.2 CEILING-MOUNTING VENTILATORS

A. Description: Centrifugal fans designed for installing in ceiling or wall or for concealed in-line applications.

B. Housing: Steel, lined with acoustical insulation.

C. Fan Wheel: Centrifugal wheels directly mounted on motor shaft. Fan shrouds, motor, and fan wheel shall be removable for service.

D. Grille: Painted steel or aluminum, louvered or egg-crate grille with flange on intake and thumbscrew attachment to fan housing.

E. Electrical Requirements: Junction box for electrical connection on housing and receptacle for motor plug-in.

F. Accessories:

1. Variable-Speed Controller: Solid-state control mounted on fan housing to reduce speed from 100 percent to less than 50 percent
2. Manual Starter Switch: Single-pole rocker switch assembly with cover and pilot light
3. Motion Sensor: Motion detector with adjustable shutoff timer
4. Isolation: Rubber-in-shear vibration isolators
5. Manufacturer's standard roof jack or wall cap and transition fittings
6. Ceiling radiation damper

2.3 SOURCE QUALITY CONTROL

A. Sound-Power Level Ratings: Comply with AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Factory test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Label fans with the AMCA-Certified Ratings Seal.

B. Fan Performance Ratings: Establish flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests and ratings according to AMCA 210, "Laboratory Methods of Testing Fans for Rating."

2.4 MOTORS

A. Manufacturer's standard

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install power ventilators level and plumb.

B. Ceiling Units: Suspend units from structure; use metal straps or hanger rods.

C. Install units with clearances for service and maintenance.

D. Secure roof-mounted fans to roof curbs with cadmium-plated hardware.

3.2 CONNECTIONS

A. Duct installation and connection requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Division 23 Section 23 33 00, "Ductwork Accessories."

B. Install ducts adjacent to power ventilators to allow service and maintenance.

C. Ground equipment.

D. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.3 FIELD QUALITY CONTROL

A. Equipment Startup Checks:

1. Verify that shipping, blocking, and bracing are removed.
2. Verify that unit is secure on supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
3. Verify that cleaning and adjusting are complete.
4. Verify that dampers in connected ductwork systems are in fully open position.

B. Starting Procedures:

1. Energize motor and adjust fan to indicated rpm.

C. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Shut unit down and reconnect automatic temperature-control operators.

E. Refer to Division 23 Section 23 05 93, "Testing, Adjusting, and Balancing," for testing, adjusting, and balancing procedures.

F. Repair or replace malfunctioning units. Retest as specified above after repairs or replacements are made.

END OF SECTION 23 34 23

SECTION 23 37 13

DIFFUSERS, REGISTERS, AND GRILLES

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 ceiling- and wall-mounted diffusers, registers, and grilles.

1.3 SUBMITTALS

A. Product Data: For each product indicated, include the following:

1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
2. Diffuser, Register, and Grille Schedule: Indicate model number and accessories furnished.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. The following requirements apply to product selection:

1. Products: Subject to compliance with requirements, provide one of the products scheduled on the drawings.

2.2 SOURCE QUALITY CONTROL

A. Verification of Performance: Rate diffusers, registers, and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install diffusers, registers, and grilles level and plumb.

B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practicable. For units installed in lay-in ceiling panels, locate units in the

center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.

C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 ADJUSTING

A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 23 37 13

SECTION 237313

MODULAR INDOOR AIR-HANDLING UNITS

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 central-station air-handling units with coils for indoor installations and variable frequency drives.

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 each central-station air-handling unit specified, including the following:

1. Certified fan-performance curves with system operating conditions indicated.
2. Certified fan-sound power ratings.
3. Certified coil-performance ratings with system operating conditions indicated.
4. Motor ratings and electrical characteristics plus motor and fan accessories.
5. Material gages and finishes.
6. Dampers, including housings.

C. Shop Drawings from Manufacturer detailing equipment assemblies and indicating dimensions, weights, loadings, required clearances, method of field assembly, components, and location and size of each field connection.

D. Field test reports indicating and interpreting test results relative to compliance with specified requirements.

E. Maintenance data for central-station air-handling units to include in the operation and maintenance manual specified in Division 1 Sections.

1.4 QUALITY ASSURANCE

A. NFPA Compliance: Central-station air-handling units and components shall be designed, fabricated, and installed in compliance with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems."

B. Unit shall be shipped/stored completely sealed from dust and debris.

C. ARI Certification: Central-station air-handling units and their components shall be factory tested according to the applicable portions of ARI 430, "Central-Station Air-Handling Units,"

and shall be listed and bear the label of the Air-Conditioning and Refrigeration Institute (ARI).

D. UL and NEMA Compliance: Provide motors required as part of air-handling units that are listed and labeled by UL and comply with applicable NEMA standards.

E. Comply with NFPA 70 for components and installation.

F. Listing and Labeling: Provide electrically operated components specified in this Section that are listed and labeled.

1. The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.

G. Coordination: Coordinate layout and installation of central-station air-handling units with piping and ductwork and with other installations.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver air-handling unit as a factory-assembled module with protective crating and covering.

B. Lift and support units with manufacturer's designated lifting or supporting points.

1.6 SEQUENCING AND SCHEDULING

A. Coordinate size and location of concrete housekeeping bases. Cast anchor-bolt inserts into base.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.

B. Fan Belts: Furnish 1 set for each central-station air-handling unit fan.

C. Gaskets: Furnish 1 for each sectional joint of each central-station air-handling unit.

D. Filters: Provide four (4) complete set of filters. One to be installed prior to startup, the second set immediately prior to Testing, Adjusting, and Balancing work.

1. Furnish two (2) additional complete sets to Owner at project closeout, and obtain receipt.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved equivalent.

1. Trane Company; Commercial Systems Group, "Performance Climate Changer".

2. Daikin, Visions Series.
3. Carrier, 39MN Series.

2.2 MANUFACTURED UNITS

A. General Description: Factory assembled, blow through, consisting of fans, motor and drive assembly, coils, damper, plenums, filter sections, drip pans, and mixing dampers. Provide double wall construction throughout.

B. Motor and Electrical Components: Refer to Division 23 Section 23 05 00, "Basic Mechanical Materials and Methods for requirements. Motor shall be specifically recommended by the Motor Manufacturer for use with variable frequency drives.

2.3 CABINET

A. Materials: Formed and reinforced galvanized steel panels, double wall construction, fabricated to allow removal for access to internal parts and components, with joints between sections sealed.

1. Outside Casing: Galvanized steel, 0.0516 inch (1.3 mm).
2. Inside Casing: Galvanized steel, 0.0396 inch (1.0 mm).
3. Mounting Rail: Galvanized steel, minimum 10 gauge.

B. Cabinet Insulation: Closed cell foam insulation, complying with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," for insulation.

1. Thickness: 2 inch (50 mm) minimum but as recommended by manufacturer to prevent condensation from forming on unit casing. All access doors shall have thermal breaks.
2. Location and Application: Factory applied between double walls with adhesive and mechanical fasteners to the internal surface of all section panels.

C. Access Panels and Doors: Same materials and finishes as cabinet and complete with hinges, latches, handles, and gaskets. Doors shall be full height and removable, with thermal breaks.

D. Fan section shall have inspection and access panels and doors sized and located to allow periodic maintenance and inspections.

E. Drain Pans: Formed sections of 304 stainless steel sheet. Fabricate pans in sizes and shapes to collect condensate from cooling coils (including coil piping connections and return bends) when units are operating at maximum catalogued face velocity across cooling coil.

1. Double-Wall Construction: Fill space between walls with foam insulation and seal moisture tight.
2. Drain Connections: Both ends of pan.
3. Units with stacked coils shall have an intermediate drain pan or drain trough to collect condensate from top coil.
4. Construct pans with slope and drain location such that water introduced into a pan will drain within 3 minutes to leave puddles no more than 2 inches (50 mm) in diameter and no more than 1/8 inch (3 mm) deep.

2.4 FAN SECTION

A. Provide ECM, motorized impeller fans. Fan assembly shall include fan, fan base, and a motor and shall be dynamically balanced by the fan manufacturer.

B. Motor control panel shall come with a low voltage terminal strip and shall include terminals for Fan ON/OFF, 0-10V signal, and fan fault.

C. Motor control panel shall come equipped with a fused disconnect.

D. Fan section shall come equipped with a motor control panel mounted on the fan section. Both line voltage and low voltage wiring shall be done by the factory. Each fan shall have an isolation switch.

E. Motor shall be brushless DC type with a permanent magnet rotor.

F. Inverter shall be integral to the motor and come as an assembly from the fan manufacturer.

G. Fan-Section Construction: Belt-driven centrifugal fans, consisting of housing, wheel, fan shaft, bearings, motor, drive assembly, and support structure, equipped with formed-steel channel base for integral mounting of fan, motor, and casing panels. Mount fan scroll, wheel, shaft, bearings, and motor on structural-steel frame, with frame mounted on base with vibration isolation.

H. Bearings, Shafts, and Drive

1. Shafts shall be solid, hot rolled steel, ground and polished, keyed to shaft, and protectively coated with lubricating oil. Hollow shafts are not acceptable.

2.5 COILS

A. Direct expansion refrigerant coils shall be provided. Provide access to coils for service and cleaning. Enclose coil headers and return bends fully within unit casing. Unit shall be provided with coil connections that extend a minimum of 3" beyond unit casing for ease of installation. Coil connections must be factory sealed with grommets on interior and exterior panel liners to minimize air leakage and condensation inside panel assembly. If not factory packaged, Contractor must supply all coil connection grommets and sleeves. Coils shall be removable through side and/or top panels of unit without the need to remove and disassemble the entire section from the unit.

B. Sweat type copper suction headers shall be provided.

C. Fins shall have a minimum thickness of 0.0075 inch aluminum plate construction. Fins shall have full drawn collars to provide a continuous surface cover over the entire tube for maximum heat transfer. Tubes shall be mechanically expanded into the fins to provide a continuous primary to secondary compression bond over the entire finned length for maximum heat transfer rates. Bare copper tubes shall not be visible between fins.

D. Coil tubes shall be 5/8 inch OD seamless copper, 0.020 inch nominal tube wall thickness, expanded into fins on 1 1/2-inch centers, brazed at joints.

E. Sweat type copper suction connections located at the bottom of the suction headers for gravity oil drainage. Coils shall be uniformly circuited in a counterflow manner for either single circuit, row, face, interlaced, or interlaced face split capacity reduction as shown on unit schedule. Pressure type liquid distributors used. Coils shall be tested with 315 pounds air pressure under warm water, and suitable for 250 psig working pressure.

2.6 DAMPERS

A. General: Leakage rate, according to AMCA 500, "Test Methods for Louvers, Dampers and Shutters," shall not exceed 2 percent of air quantity at 2000 fpm (10 m/s) face velocity through damper and 4 inch wg (1000 Pa) pressure differential.

2.7 FILTERS

A. Filter Sections: Provide filter media holding frames arranged as indicated, with access doors on both sides of unit. Provide sections for filters. All permanent filters to be in place before any testing or operation of air units.

B. Filters: Provide per schedule on the drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions to receive equipment, for compliance with installation tolerances and other conditions affecting performance of central-station air-handling units.

B. Examine roughing-in of hydronic, condensate drainage piping, and electrical to verify actual locations of connections before installation.

C. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install central-station air-handling units level and plumb, according to Manufacturer's written instructions.

B. Floor-Mounted Units: Support on 4 inches high reinforced concrete housekeeping bases using neoprene pads. Secure units to anchor bolts installed in concrete housekeeping base.

C. Arrange installation of units to provide access space around air-handling units for service and maintenance.

D. All air handlers shall have safety drip pans complete with condensate piping to drains. Internal pans shall be stainless steel, double sloped to drains to assure no standing water. External secondary pans may be 18-gauge galvanized. Drain pan to be elevated a minimum of 4 inches above finished floor elevation to provide sufficient drain slope. Each secondary unit drain shall be piped separate from its internal drip pan drain.

E. Install P-traps at air unit condensate drains and overflow drains with depth at least 4 inches greater than the highest static pressure attainable by the unit. Air handlers shall be fitted with drain clean-outs. Condensate drains shall drain open sight to floor drains and not be connected directly to sewer system.

3.3 HOUSEKEEPING BASES

A. Coordinate size of housekeeping bases with actual unit sizes provided. Construct base 4 inches (100 mm) larger in both directions than overall dimensions of supported unit.

B. Form concrete bases with framing lumber with form-release compounds. Chamfer top edge and corners of base.

C. Install reinforcing bars, tied to frame, and place anchor bolts and sleeves to facilitate securing units.

D. Place concrete and allow to cure before installing units. Use portland cement conforming to ASTM C 150, 3000 psig (27.6 MPa) compressive strength, and normal-weight aggregate.

3.4 CONNECTIONS

A. Piping installation requirements are specified in other Division 23 Sections. The Drawings indicate the general arrangement of piping, fittings, and specialties. The following are specific connection requirements:

1. Install piping adjacent to machine to allow service and maintenance.
2. Connect piping to air-handling units with flexible connectors.
3. Connect condensate drain pans. Extend to nearest equipment or floor drain. Construct deep trap at connection to drain pan and install cleanouts at changes in direction.
4. Condensate: Conform to applicable requirements of Division 23 Section 23 21 15, "Condensate Drain Piping." Connect to drain pan with trap and slope piping as specified.

B. Duct installation and connection requirements are specified in other Division 23 Sections. The Drawings indicate the general arrangement of ducts and duct accessories. Make final duct connections with flexible connections.

3.5 ADJUSTING

A. Adjust damper linkage for proper damper operation.

3.6 CLEANING

A. After completing installation, inspect exposed finish. Remove burrs, dirt, and construction debris, and repair damaged finishes including chips, scratches, and abrasions.

B. Clean fan interiors to remove foreign material and construction dirt and dust. Vacuum clean fan wheels, cabinets, and coils entering air face.

3.7 COMMISSIONING

A. Manufacturer's Field Inspection: Engage factory-authorized service representatives to perform the following:

1. Inspect field assembly of components and installation of central-station air-handling units including piping, ductwork, electrical connections, and variable frequency drives.
2. Prepare a written report on findings and recommended corrective actions.

B. Final Checks before Startup: Perform the following before startup:

1. Verify that shipping, blocking, and bracing are removed.
2. Verify that unit is secure on mountings and supporting devices and that connections for piping, ductwork, and electrical are complete. Verify that proper thermal overload protection is installed in motors, starters, and disconnects.
3. Perform cleaning and adjusting specified in this Section.
4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify free fan wheel rotation and smooth bearings operations. Reconnect fan drive system, align belts, and install belt guards.
5. Lubricate bearings, pulleys, belts, and other moving parts with factory-recommended lubricants.
6. Set outside-air and return-air mixing dampers to minimum outside-air setting.
7. Comb coil fins for parallel orientation.
8. Install clean filters.
9. Verify that manual and automatic volume control, and fire and smoke dampers in connected ductwork systems are in fully open position.

C. Starting procedures for central-station air-handling units include the following:

1. Energize motor; verify proper operation of motor, drive system, and fan wheel. Adjust fan to indicated rpm.

    a. Replace fan and motor pulleys as required to achieve design conditions.

2. Measure and record motor electrical values for voltage and amperage.

D. Do not allow air unit operation during or after construction without a complete set of permanent air filters including any required spacers. Units found violating this instruction shall immediately be locked off and cleaned with proper chemicals and pressure washers.

E. Refer to Division 23 Section 230593, "Testing, Adjusting, and Balancing," for air-handling system testing, adjusting, and balancing.

3.8 DEMONSTRATION

A. Engage the services of factory-authorized service representatives to train Owner's maintenance personnel on procedures and schedules related to startup and shutdown, troubleshooting, servicing, and preventive maintenance of all equipment in this Section.

1. Review data in the operation and maintenance manuals. Refer to Division 1 Section "Project Closeout."
2. In addition, provide a minimum of 8 hours training on VFD's.
3. Schedule training with Owner, through Architect, with at least 7 days' advance notice.

END OF SECTION 23 73 13

SECTION 23 81 26

SPLIT-SYSTEM AIR CONDITIONING UNITS

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 split-system air conditioning units consisting of separate indoor air handling units with evaporator, electric resistance heater and fan and outdoor air-cooled units with compressor and condenser components. Indoor air handling units are designed for and are connected to ducts. Outdoor units are air cooled and designed for pad mounting as indicated.

1.3 SUBMITTALS

A. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated. Include performance data in terms of capacities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For split-system air conditioning units to include in emergency, operation, and maintenance manuals.

E. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

A. Product Options: Drawings indicate size, profiles, and dimensional requirements of split-system units and are based on the specific system indicated.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.5 COORDINATION

A. Coordinate size, location, and connection details with equipment supports as indicated on the Drawings.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to the following:

a. Compressor failure.
b. Condenser or evaporator coil leak.

2. Warranty Period: Five years from date of Substantial Completion.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Filters: One set of filters for each unit.
2. Fan Belts: One set of belts for each belt drive unit.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following or approved equal:

	1-1/2 to 5 Tons		6 to 7.5 Tons	
	Indoor Unit	Outdoor Unit	Indoor Unit	Outdoor Unit
Trane:	TAM 7	4TTR7	TWE	TTA
Lennox:	CBX32MV	XC16	TAA	TSA
York:	LX-AHE	LX14	YE	NL
Daikin:		DX5SEA	DAX	DZ14XA

2.2 AIR HANDLING, EVAPORATOR FAN COMPONENTS (INDOOR UNITS)

A. Cabinet: Galvanized or enameled steel with removable panels on front and ends in color selected by Architect.

1. Insulation: Faced, glass-fiber, duct liner coated to prevent erosion of liner into air stream.
2. Drain Pans: Insulated, galvanized steel, with connection for drain; insulated drain trap.

B. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with thermal-expansion valve.

C. Electric Coil: Factory-installed; helical, nickel-chrome, resistance-wire heating elements with refractory ceramic support bushings; automatic-reset thermal cutout; built-in magnetic contactors; manual-reset thermal cutout; airflow proving device; one-time fuses in terminal box for overcurrent protection; and required heating controls with control circuit transformer.

D. Fan: Direct or belt drive, centrifugal, as indicated. Fan shall be forward-curve, statically and dynamically balanced. Adjustable sheaves for belt drive.

E. Fan Motors:

1. Special Motor Features: Multi-tapped, multi-speed or variable speed as indicated for direct drive.
2. Internal thermal protection.

3. Permanently lubricated.
4. Resiliently mounted.

F. Disposable Filters: 2 inches thick, 30 percent efficiency, pleated.

G. Filter Housing: Designed for 2 inches thick filter and equipped with hinged access door on each side of unit for easy filter removal/replacement.

H. Single Point Electrical Connections: Units shall have a single point of connection for all electrical power and shall be internally wired at the factory including fan, electric heat, and all required transformers, contactors, etc.

2.3 AIR-COOLED, OUTDOOR COMPRESSOR-CONDENSER COMPONENTS (OUTDOOR UNITS)

A. Casing: Steel, finished with baked enamel in manufacturer's standard color, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.

B. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.

1. Compressor Type: Scroll.

C. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with liquid sub-cooler.
D. Fan: Aluminum-propeller type, directly connected to motor, vertical discharge.
E. Motor: Permanently lubricated ball bearing, with integral thermal-overload protection on each leg.
F. Low Ambient Kit: Permits operation down to 10 degrees F.
G. Hail guard painted to match unit.
H. SEER: Minimum as scheduled on Drawings.
I. Dual compressor or two speed compressor.

2.4 ACCESSORIES

A. Thermostat: Electronic programmable type to control compressor and evaporator fan, with the following features:

1. Compressor time delay.
2. 7 day programmable clock with 4 time periods per day.
3. Liquid-crystal display indicating temperature, set-point temperature, time setting, operating mode, and fan speed.
4. Fan-speed selection, including auto setting.
5. 4-hour setback override.
6. Non-volatile memory.
7. Adjustable heat/cool set point limiting.

B. Operating and Safety Controls:

1. Manual reset, high pressure cutout switches.
2. Automatic reset, low pressure cutout switches.
3. Low oil pressure switch.
4. Compressor winding cutout switch.
5. Control transformer.
6. Magnetic contactors for compressor and condenser fan motors.

7. Automatic-reset timer to prevent rapid cycling of compressor.

C. Fire Protection Thermostats: Provide manual reset type adjustable fire protection thermostats set at 165 degrees F to automatically shut down the indoor unit fan for the following systems:

1. Units with a scheduled fan capacity of 2,000 cfm or less. Locate thermostats in the duct systems as follows:

a. In the return air upstream of any connection of exhaust or outside air.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units level and plumb.

B. Install evaporator-fan components (air handling units) using manufacturer's standard mounting devices securely fastened to building structure.

C. Install ground-mounting, compressor-condenser components on 4 inch (100 mm) thick, reinforced concrete base; 4 inches (100 mm) larger on each side than unit. Concrete, reinforcement, and formwork are specified in Division 3 Section "Cast-in-Place Concrete." Coordinate anchor installation with concrete base.

D. Install and connect refrigerant piping to component's fittings. Install piping to allow access to unit and route as indicated on the drawings.

3.2 CONNECTIONS

A. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to unit to allow service and maintenance.

C. Duct Connections: Duct installation requirements are specified in Division 23 Section 23 31 13, "Metal Ducts." Drawings indicate the general arrangement of ducts. Connect supply and return ducts to split-system air conditioning units with flexible duct connectors. Flexible duct connectors are specified in Division 23 Section 23 33 00, "Ductwork Accessories." Provide manual opposed blade dampers in return air and outside air ducts.

D. Ground equipment according to Division 26 Section 26 05 26, "Grounding and Bonding."

E. Electrical Connections: Comply with requirements in Division 26 Sections for power wiring, switches, smoke detectors, fire protection thermostats, and motor controls.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections. Report results in writing.

B. Perform the following field tests and inspections and prepare test reports:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Remove and replace malfunctioning units and retest as specified above.

3.4 START-UP SERVICE

A. Engage a factory-authorized service representative to perform start-up service.

1. Complete installation and start-up checks according to manufacturer's written instructions.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain units. Refer to Division 1 Section "Closeout Procedures."

END OF SECTION 23 81 26

SECTION 23 81 29

VARIABLE REFRIGERANT VOLUME HEAT RECOVERY CONDENSING UNIT

PART 1- GENERAL

1.01 SECTION INCLUDES

A. Variable refrigerant volume HVAC system includes:
1. Outdoor/Condensing unit(s):
a. Size Range: 6 to 38 Tons Nominal

1.02 RELATED DOCUMENTS

A. Section 23 81 30 Multi Evaporator DX Split System Indoor Units

1.03 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 each central-station air-handling unit specified, including the following:
1. Certified fan-performance curves with system operating conditions indicated.
2. Certified fan-sound power ratings.
3. Certified coil-performance ratings with system operating conditions indicated.
4. Motor ratings and electrical characteristics plus motor and fan accessories.
5. Material gages and finishes.
6. Dampers, including housings.

C. Shop Drawings from Manufacturer detailing equipment assemblies and indicating dimensions, weights, loadings, required clearances, method of field assembly, components, and location and size of each field connection.

D. Field test reports indicating and interpreting test results relative to compliance with specified requirements.

E. Maintenance data for central-station air-handling units to include in the operation and maintenance manual specified in Division 1 Sections.

1.04 QUALITY ASSURANCE

A. MANUFACTURER QUALIFICATIONS:
1. The units shall be tested by a National Recognized Testing Laboratory (NRTL), in accordance with ANSI/UL 1995 – Heating and Cooling Equipment and bear the Listed Mark.
2. All wiring shall be in accordance with the National Electric Code (NEC).
3. The system will be produced in an ISO 9001 and ISO 14001 facility, which are standards set by the International Standard Organization (ISO). The system shall be factory tested for safety and function.
4. The condensing unit will be factory charged with R410A.

1.05 DELIVERY, STORAGE AND HANDLING

A. Unit shall be stored and handled according to the manufacturer's recommendations.

1.06 WARRANTY

A. The units shall have a manufacturer parts and contractor labor warranty for a period of one (1) year from date of Substantial Completion. Units and components shall be covered by the manufacturer's limited warranty for a period of ten (10) years from date of installation. The controls shall have a warranty of one (1) year from date of installation.

B. INSTALLATION REQUIREMENTS

1. The system must be installed by a Daikin or Mitsubishi factory trained contractor/dealer. The bidders shall be required to submit training certification proof.

PART - PRODUCTS

2.01 MANUFACTURERS

A. DESIGN BASIS:

1. The HVAC equipment basis of design is Daikin North America. All bidders shall furnish the minimum system standards as defined by the base bid model numbers, model families or as otherwise specified herein. The contractor shall be responsible for all specified items and intents of this document without further compensation.

2.02 HVAC SYSTEM DESIGN

A. SYSTEM DESCRIPTION:

1. The system shall consist of multiple evaporators, branch selector boxes, REFNET™ joints and headers, a three-pipe refrigeration distribution system using PID control and VRV® condenser unit.
2. The condenser shall be a direct expansion (DX), air-cooled heat recovery, multi-zone air-conditioning system with variable speed inverter driven compressors using R-410A refrigerant.
3. The condensing unit may connect an indoor evaporator capacity up to 200% of the condensing unit nominal capacity. All zones are each capable of operating separately with individual temperature control.
4. A dedicated hot gas pipe shall be required to ensure optimum heating operation performance.
    a. Two-pipe, heat recovery systems utilizing a lower temperature mixed liquid/gas refrigerant to perform heat recovery are not acceptable due to reduced heating capabilities.
5. The condensing unit shall be interconnected to indoor units in accordance with Manufacturer's recommended practices.
    a. The indoor units shall be connected to the condensing unit utilizing Daikin's REFNET™ specified piping joints and headers to ensure correct refrigerant flow and balancing. T style joints are not acceptable for a variable refrigerant system.
6. Operation of the system shall permit either individual cooling or heating of each indoor unit simultaneously or all of the indoor units associated with each branch of the cool/heat selector box. Each indoor unit or group of indoor units shall be able to provide set temperature independently via a local remote controller, an Intelligent Controller, an Intelligent Manager or a BMS interface.
7. Branch selector boxes:
    a. The branch selector boxes shall have the capacity to control up to 290 MBH (cooling) downstream of the branch selector box.

b. Each branch of the branch selector box shall consist of three electronic expansion valves, refrigerant control piping and electronics to facilitate communications between the box and main processor and between the box and indoor units.

c. The branch selector box shall control the operational mode of the subordinate indoor units. The use of three EEV's ensures continuous heating during defrost (multiple condenser systems), no heating impact during changeover and reduced sound levels.

d. The use of solenoid valves for changeover and pressure equalization shall not be acceptable due to refrigerant noise.

B. VRV IV FEATURES

1. Voltage Platform - Heat pump condensing units shall be available with a 230-208V/3ph/60Hz power supply.

2. Advanced Zoning - A single system shall provide for up to 64 zones.

3. Independent Control - Each indoor unit shall use a dedicated electronic expansion valve with 2000 positions for independent control.

4. VFD Inverter Control and Variable Refrigerant Temperature - Each condensing unit shall use high efficiency, variable speed all "inverter" compressor(s) coupled with inverter fan motors to optimize part load performance. The system capacity and refrigerant temperatures shall be modulated automatically to set suction and condensing pressures while varying the refrigerant volume for the needs of the cooling or heating loads. The control will be automatic and customizable depending on load and weather conditions.

a. Indoor shall use PID to control superheat to deliver a comfortable room temperature condition and optimize efficiency.

5. Configurator software - Each system shall be available with configurator software package to allow for remote configuration of operational settings and also for assessment of operational data and error codes.

6. Each system shall be capable of seamless integration with Dedicated Outside Air System (DOAS) controls.

7. Autocharging - Each system shall have a refrigerant auto-charging function.

8. Defrost Heating – Multiple condenser VRV systems shall maintain continuous heating during defrost operation. Reverse cycle (cooling mode) defrost operation shall not be permitted due to the potential reduction in space temperature.

9. Oil Return Heating – Multiple condenser VRV systems shall maintain continuous heating during oil return operation. Reverse cycle (cooling mode) oil return during heating operation shall not be permitted due to the potential reduction in space temperature.

10. Low Ambient Cooling - Each system shall be capable of low ambient cooling operation to -4°F DB (-20°CDB).

11. Independent Control - Each indoor unit shall use a dedicated electronic expansion valve for independent control.

12. Flexible Design –

a. Systems shall be capable of up to 540ft (165m) [623 ft. (190m) equivalent] of linear piping between the condensing unit and furthest located indoor unit.

b. Systems shall be capable of up to 3,280ft (1,000m) total "one-way" piping in the piping network.

c. Systems shall have a vertical (height) separation of up to 295ft between the condensing unit and the indoor units.

d. Systems shall be capable of up to 295ft (90m) from the first REFNET™ / branch point.

e. The condensing unit shall have the ability to connect an indoor unit evaporator capacity of up to 200% of the condensing unit nominal capacity.

f. Systems shall be capable of 98ft (30m) vertical separation between indoor units.

g. Condensing units shall be supported with a fan motor ESP up to 0.32" WG as standard to allow connection of discharge ductwork and to prevent discharge air short circuiting.

13. Oil return – Each system shall be furnished with a centrifugal oil separator and active oil recovery cycle.

14. Simple wiring – Systems shall use 16/18 AWG, 2 wire, stranded, non-shielded and non-polarized daisy chain control wiring.

15. Advanced diagnostics – Systems shall include a self-diagnostic, auto-check function to detect a malfunction and display the type and location.

16. Each condensing unit shall incorporate contacts for electrical demand shedding with optional 3 stage demand control with 12 customizable demand settings.

17. Advanced controls – Each system shall have at least one remote controller capable of controlling up to 16 indoor units.

18. Each system shall be capable of integrating with open protocol BACnet and LonWorks building management systems.

19. Low sound levels - Each system shall use indoor and condensing units with quiet operation as low as 27 dB(A).

C. PERFORMANCE:

1. The system shall have the performance capacity as schedules on the drawings.

2. Cooling or Cooling Dominant Operation:

a. The operating range in cooling or cooling dominant simultaneous cooling/heating will be 23°FDB (-5°CDB) ~ 110°FDB (43.3°CDB).

b. Cooling mode indoor room temperature range will be 57-77°FWB (13.8 - 25°CWB).

c. Each system as standard shall be capable of onsite reprogramming to allow low ambient cooling operation down to -4°FDB (-20°CDB).

3. Heating or Heating Dominant Operation:

a. The operating range in heating or heating dominant simultaneous cooling/heating will be -22° – 61°FWB (-30 – 16°CWB).

1) If an alternate equipment manufacturer is selected, the mechanical contractor shall provide, at their own risk and cost, all additional material and labor to meet low ambient operating condition and performance

b. Heating mode indoor room temperature range will be 59°FDB - 80°F DB (15°CDB – 26.7°CDB).

2.03 EQUIPMENT

A. ELECTRICAL:

1. The power supply to the condensing unit shall be as indicated on the drawings.

B. WIRING:

1. The control voltage between the indoor and condensing unit shall be 16VDC non-shielded, stranded 2 conductor cable.

2. The control wiring shall be a two-wire multiplex transmission system, making it possible to connect multiple indoor units to one condensing unit with one 2-cable wire, thus simplifying the wiring installation.

3. The control wiring maximum lengths shall be as recommended by the equipment manufacturer.

C. REFRIGERANT PIPING:

1. The system shall be capable of refrigerant piping up to 540ft (165m) actual or 623ft (190m) equivalent from the condensing unit to the furthest indoor unit, a total combined liquid line length of 3,280ft (1,000m) of piping between the condensing and indoor units with 295ft (90m) maximum vertical difference, without any oil traps or additional components.

2. REFNET™ piping joints and headers shall be used to ensure proper refrigerant balance and flow for optimum system capacity and performance.

a. T style joints shall not be acceptable as this will negatively impact proper refrigerant balance and flow for optimum system capacity and performance.

D. PAINT/CORROSION RESISTANCE:

1. Paint and corrosion resistance shall be at a minimum per the Table A, at the end of this Section.

2.04 OUTDOOR/CONDENSING UNIT

A. GENERAL:

1. The condensing unit is designed specifically for use with VRV series components.

2. The condensing unit shall be factory assembled in the USA and pre-wired with all necessary electronic and refrigerant controls.

3. The refrigeration circuit of the condensing unit shall consist of inverter scroll compressors, motors, fans, condenser coil, electronic expansion valves, solenoid valves, 4-way valve, distribution headers, capillaries, filters, shut off valves, oil separators, service ports and refrigerant accumulator.

4. Liquid and suction lines must be individually insulated between the condensing and indoor units.

5. The condensing unit can be wired and piped with access from the left, right, rear or bottom.

6. The connection ratio of indoor units to condensing unit shall be permitted up to 200% of nominal capacity.

7. Each condensing system shall be able to support the connection of up to 64 indoor units dependent on the model of the condensing unit.

8. The sound pressure level standard shall be that value as listed in the manufactures engineering manual for the specified models at 3 feet from the front of the unit. The condensing unit shall be capable of operating automatically at further reduced noise during night time or via an external input.

9. The system will automatically restart operation after a power failure and will not cause any settings to be lost, thus eliminating the need for reprogramming.

10. The unit shall incorporate an auto-charging feature to ensure optimum performance. Manual changing should be support with a minimum of 2 hours of system operation data to ensure correct operation.

11. The condensing unit shall be modular in design and should allow for side-by-side installation with minimum spacing.

12. The following safety devices shall be included on the condensing unit; high pressure sensor and switch, low pressure sensor, control circuit fuses, crankcase heaters, fusible plug, overload relay, inverter overload protector, thermal protectors for compressor and fan motors, over current protection for the inverter and anti-recycling timers.

13. To ensure the liquid refrigerant does not flash when supplying to the various indoor units, the circuit shall be provided with a sub-cooling feature.

14. Oil recovery cycle shall be automatic occurring 2 hours after start of operation and then every 8 hours of operation. Each system shall maintain continuous heating during oil return operation.

15. The condensing unit shall be capable of heating operation at -13°F (-25°C) wet bulb ambient temperature without additional low ambient controls or an auxiliary heat source.

16. The multiple condenser VRV systems shall continue to provide heat to the indoor units in heating operation while in the defrost mode.

B. UNIT CABINET:

1. The condensing unit shall be completely weatherproof and corrosion resistant. The unit shall be constructed from rust-proofed galvanized steel panels coated with a baked enamel finish.

C. FAN:

1. The condensing unit shall consist of one or more propeller type, direct-drive 500 or 600W fan motors that have multiple speed operation via a DC (digitally commutating) inverter.

2. The condensing unit fan motor shall have multiple speed operation of the DC (digitally commutating) inverter type, and be of high external static pressure and shall be factory set as standard at 0.12 in. WG. A field setting switch to a maximum 0.32 in. WG pressure is available to accommodate field applied duct for indoor mounting of condensing units.

3. The fan shall be a vertical discharge configuration.

4. The fan motor shall have inherent protection and permanently lubricated bearings and be mounted.

5. The fan motor shall be provided with a fan guard to prevent contact with moving parts.

D. CONDENSER COIL:

1. The condenser coil shall be manufactured from copper tubes expanded into aluminum fins to form a mechanical bond.

2. The heat exchanger coil shall be of a waffle louver fin and rifled bore tube design to ensure high efficiency performance.

3. The heat exchanger on the condensing units shall be manufactured from Hi-X seamless copper tube with N-shape internal grooves mechanically bonded on to aluminum fins to an e-Pass Design.

4. The fins shall be coated with an anti-corrosion hydrophilic blue coating as standard from factory with a salt spray test rating of 1000hr per ASTM test standards.

5. The outdoor coil shall have three-circuit heat exchanger design eliminating the need for a drain pan heater. The lower part of the coil shall be used for inverter cooling and be on or off during heating operation enhancing the defrost operation.

a. An alternate manufacturer must provide a drain pan heater to enable adequate defrosting of the unit in defrost operation.

6. The condensing unit shall be factory equipped with condenser coil guards on all sides.

E. COMPRESSOR:

1. The inverter scroll compressors shall be variable speed to change the speed to follow the variations in total cooling and heating load as determined by the suction gas pressure as measured in the condensing unit.

a. In addition, samplings of evaporator and condenser temperatures shall be made so that the high/low pressures detected are read every 20 seconds and calculated. With each reading, the compressor capacity (INV frequency) shall be controlled to eliminate deviation from target value.

1) Non –inverter-driven compressors, which may cause starting motor current to exceed the nominal motor current (RLA) and require larger wire sizing, shall not be allowed.

2. The inverter driven compressors in the condensing unit shall be of highly efficient reluctance DC (digitally commutating), hermetically sealed scroll “G-type” or “J-type”.

3. Neodymium magnets shall be adopted in the rotor construction to yield a higher torque and efficiency in the compressor instead of the normal ferrite magnet type.

a. At complete stop of the compressor, the neodymium magnets will position the rotor into the optimum position for a low torque start.

4. The capacity control range shall be as low as 3% to 100%.

5. The compressor’s motor shall have a cooling system using discharge gas, to avoid sudden changes in temperature resulting in significant stresses on winding and bearings.

6. Each compressor shall be equipped with a crankcase heater, high pressure safety switch, and internal thermal overload protector.

7. Oil separators shall be standard with the equipment together with an intelligent oil management system.

8. The compressor shall be spring mounted to avoid the transmission of vibration eliminating the standard need for spring insolation.

9. In the event of compressor failure, the remaining compressors shall continue to operate and provide heating or cooling as required at a proportionally reduced capacity. The microprocessor and associated controls shall be designed to specifically address this condition for single module and manifolded systems.

10. In the case of multiple condenser modules, conjoined operation hours of the compressors shall be balanced by means of the Duty Cycling Function, ensuring sequential starting of each module at each start/stop cycle, completion of oil return, completion of defrost or every 8 hours. When connected to a central control system sequential start is activated for all system on each network.

2.05 BRANCH SELCTOR UNITS

A. GENERAL:

1. The branch selector boxes shall be designed specifically for use with VRV IV series heat recovery system components.

a. These selector boxes shall be factory assembled, wired, and piped.

b. The branch controllers must be run tested at the factory.

c. These selector boxes must be mounted indoors.

d. When simultaneously heating and cooling, the units in heating mode shall energize their subcooling electronic expansion valve.

B. UNIT CABINET

1. These units shall have a galvanized steel plate casing.

2. Each cabinet shall house 3 electronic expansion valves for refrigerant control per branch.

3. The cabinet shall contain one subcooling heat exchanger per branch.

4. The unit shall have sound absorption thermal insulation material made of flame and heat resistant foamed polyethylene.

5. Nominal sound pressure levels must be measured and published on the submittals by the manufacturer.

C. REFRIGERANT VALVES:

1. The unit shall be furnished with 3 electronic expansion valves per branch to control the direction of refrigerant flow. The use of solenoid valves for changeover and pressure equalization shall not be acceptable due to refrigerant noise.

2. The refrigerant connections must be of the braze type.

3. In multi-port units, each port shall have its own electronic expansion valves. If common expansion/solenoid valves are used, redundancy must be provided.

4. Each circuit shall have at least one indoor unit.

5. Multiple indoor units may be connected to a branch selector box with the use of a REFNET™ joint provided they are within the capacity range of the branch selector.

D. CONDENSTATE REMOVAL:

1. The unit shall not require provisions for condensate removal. A safety device or secondary drain pan shall be installed by the mechanical contractor to comply with the applicable mechanical code, if an alternate manufacturer is selected.

E. ELECTRICAL:

1. The unit electrical power shall be 208/230 volts, 1 phase, 60 hertz.
2. The unit shall be capable of operation within the limits of 187 volts to 255 volts.
3. The minimum circuit amps (MCA) shall be 0.1 and the maximum overcurrent protection amps (MOP) shall be 15.
4. The control voltage between the indoor and condensing unit shall be 16VDC non-shielded 2 conductor cable.

2.06 INDOOR/EVAPOTATOR UNITS

A. Refer to Section Multi Evaporator DX Split System Indoor Units.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units level and plumb.

B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.

C. Install ground-mounting, compressor-condenser components on polyethylene mounting base.

D. Install and connect pre-charged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

E. Provide spare washable filters in addition to the initial set for each unit.

1. 3’ x 3’ size – 20 filters.
2. 2’ x 2’ size – 10 filters.

3.2 CONNECTIONS

A. Piping installation requirements are specified in other Division 22 and 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to unit to allow service and maintenance.

C. Ground equipment according to Division 26 Section, "Grounding and Bonding."

D. Electrical Connections: Comply with requirements in Division 26 Sections for power wiring, switches, and motor controls.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections. Report results in writing.

B. Perform the following field tests and inspections and prepare test reports:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Remove and replace malfunctioning units and retest as specified above.

3.4 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.

3.5 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain units. Refer to Division 1.

Table A

COMPONENT	VRV IV		
	BASE MATERIAL	SURFACE TREATMENT	COATING THICKNESS External & Internal Surface
EXTERNAL PANEL BASE	Galvanized steel	POLYESTER	≧1.5 mils
EXTERNAL FRONT PANEL	Galvanized steel	POLYESTER	≧1.5 mils
PILLAR	Galvanized steel	POLYESTER	≧1.5 mils
COMPRESSOR COVER	ASTM material	Resin Paint	≧0. 78 mils
FIN GUARD	Iron wire	Resin Paint	≧0. 79 mils
FAN GUARD AND	Polypropylene	No treatment required	N/A

DRUM			
FAN	Acrylonitrile - glass	No treatment required	N/A
FAN MOTOR FRAME	Resin	No treatment required	N/A
FAN MOTOR SHAFT	Carbon steel	No treatment required	N/A
FAN MOTOR SUPPORT	Galvanized steel	POLYESTER	≧1.5 mils
HEAT EXCHANGERS (FIN ONLY)	Aluminum	Polymer Anti-corrosion surface treatment	Salt Spray 1000 hours, blister rating 10
ELECTRICAL PARTS BOX	Hot-dip zinc-coated steel	No treatment required	N/A
ELECTRICAL PARTS BOARD	Glass cloth / Glass nonwoven cloth material	Insulation Varnish	No specific thickness
SCREWS	Carbon steel wire rods	High corrosion resistance treatment	≧0. 28 mils

END OF SECTION 23 81 29

SECTION 23 81 30

MULTI EVAPORATOR DX SPLIT SYSTEM INDOOR UNITS

PART 1 - GENERAL

1.01 SUMMARY

0.6 to 8 Tons Nominal

A. This Section includes the following indoor units:

1. WALL MOUNTED UNIT

1.02 QUALITY ASSURANCE

A. The units shall be tested by a Nationally Recognized Testing Laboratory (NRTL), in accordance with ANSI/UL 1995/CAN/CSA-C22.2 No. 236-05 (R2009) – Heating and Cooling Equipment and bear the Listed Mark.

B. All wiring shall be in accordance with the National Electric Code (NEC)/Canadian Electrical Code (CEC).

C. The system will be produced in an ISO 9001 and ISO 14001 facility, which are standards set by the International Standard Organization (ISO). The system shall be factory tested for safety and function.

D. The outdoor unit will be factory charged with R-410A.

1.03 DELIVERY, STORAGE AND HANDLING

A. Unit shall be stored and handled according to the manufacturer's recommendations.

PART 2 - WARRANTY

2.01 STANDARD LIMITED WARRANTY

A. Manufacturer shall warrant that (the "Products") will be free from defects in material and workmanship. The warranty applies to all parts and shall be ten (10) years starting from the ''installation date'' which is one of the two dates below:
The installation date is the date that the unit is originally commissioned, but no later than 18 months after the manufacture date noted on the unit's rating plate.

B. If the date the unit is originally commissioned cannot be verified, the installation date is three months after the manufacture date.

PART 3 - PERFORMANCE

3.01 DESIGN BASIS

A. The HVAC equipment basis of design is Daikin. All bidders shall furnish the minimum system standards as defined by the base bid model numbers, model families or as otherwise specified herein. The contractor shall be responsible for all specified items and intents of this document without further compensation.

PART 4 - PRODUCTS

4.01 WALL MOUNTED UNIT

A. General: Indoor units shall be a wall mounted fan coil unit, operable with refrigerant R-410A, equipped with an electronic expansion valve, for installation onto a wall within a conditioned space. Units shall be connected to outdoor unit heat pump or heat recovery model. Computerized PID control shall be used to control superheat to deliver a comfortable room temperature condition. The unit shall be equipped with a programmed drying mechanism that dehumidifies while limiting changes in room temperature. A mildew-proof, polystyrene condensate drain pan and resin net mold resistant filter shall be included as standard equipment. The indoor units sound pressure shall range from 31 dB(A) to 41 dB(A) at low speed measured at 3.3 feet below and from the unit.

B. Performance: Each unit's performance shall be as scheduled on the drawings.

C. Indoor Unit:

1. The indoor units shall be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, condensate drain pan, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch. The unit shall have an auto-swing louver which ensures efficient air distribution, which closes automatically when the unit stops. The remote controller shall be able to set five (5) steps of discharge angle. The front grille shall be easily removed for washing. The discharge angle shall automatically set at the same angle as the previous operation upon restart. The drain pipe can be fitted to from either left or right sides.

2. Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.

3. Both refrigerant lines shall be insulated from the outdoor unit.

4. Return air shall be through a resin net mold resistant filter.

5. The indoor units shall be equipped with a condensate pan.

6. The indoor units shall be equipped with a return air thermistor.

7. The indoor unit will be separately powered with 208~230V/1-phase/60Hz.

8. The voltage range will be 253 volts maximum and 187 volts minimum.

D. Unit Cabinet:

1. The cabinet shall be affixed to a factory supplied wall mounting template and located in the conditioned space.

2. The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.

E. Fan:

1. The fan shall be a direct-drive cross-flow fan, statically and dynamically balanced impeller with high and low fan speeds available.

2. The fan motor shall operate on 208/230 volts, 1 phase, 60 hertz with a motor output range 0.054 to 0.058 HP.

3. The airflow rate shall be available in high and low settings.

4. The fan motor shall be thermally protected.

F. Coil:

1. Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.

2. The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.

3. The coil shall be a 2-row cross fin copper evaporator coil with 14 fpi design completely factory tested.

4. The refrigerant connections shall be flare connections and the condensate will be 11/16 inch outside diameter PVC.

5. A thermistor will be located on the liquid and gas line.

6. A condensate pan shall be located in the unit.

G. Electrical:

1. A separate power supply will be required of 208/230 volts, 1 phase, 60 hertz. The acceptable voltage range shall be 187 to 253 volts.

2. Transmission (control) wiring between the indoor and outdoor unit shall be a maximum of 3,280 feet (total 6,560 feet).

3. Transmission (control) wiring between the indoor unit and remote controller shall be a maximum distance of 1,640 feet.

H. Control:

1. The unit shall have controls provided by the manufacturer to perform input functions necessary to operate the system.

2. The unit shall be compatible with interfacing with a BMS system via BACnet gateway.

I. Optional Accessories:

1. Remote “in-room” sensor kit.

2. A condensate pump

4.04 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

B. Fan Belts: One set for each belt-drive fan.

C. Filters:

Provide 1 complete set of filters to be installed immediately prior to Testing, Adjusting and Balancing work. Furnish 2 additional complete sets to the owner and obtain receipt.

END OF SECTION 23 81 30

DIVISION 26
ELECTRICAL

26 00 01	ELECTRICAL GENERAL PROVISIONS
26 05 00	BASIC MATERIALS AND METHODS
26 05 26	GROUNDING
26 05 71	ACCEPTANCE TESTING
26 05 72	OVERCURRENT PROTECTIVE DEVICE SHORT-CIRCUIT STUDY
26 05 74	OVERCURRENT PROTECTIVE DEVICE ARC-FLASH STUDY
26 09 23	OCCUPANCY SENSORS
26 27 13	ELECTRICAL DISTRIBUTION SYSTEM
26 43 13	SURGE PROTECTION FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS
26 51 00	LIGHTING FIXTURES

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 05 13 Telephone/Data/CATV Communication System

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