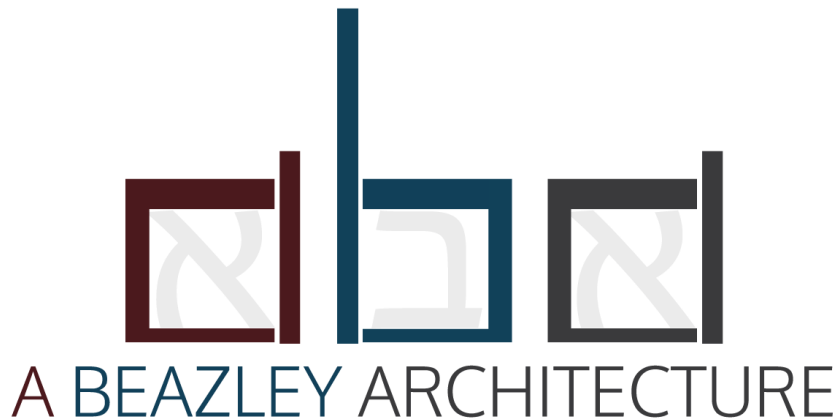
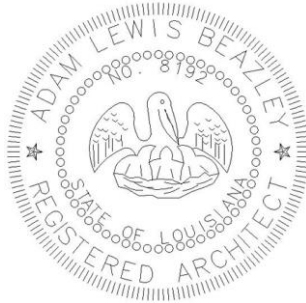


PROJECT MANUAL

HARVEST COMMUNITY CENTER NEHEMIAH PROJECT

819 EAST SIMCO STREET
LAFAYETTE, LOUISIANA 70501

PROJECT NO. 2025-006
DECEMBER 10, 2025

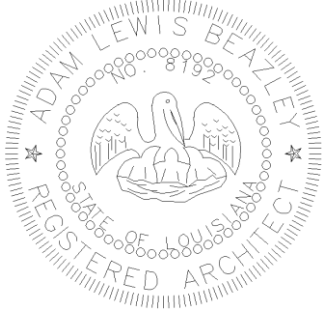


PH: 337.849-3209

P.O. BOX 80342

LAFAYETTE, LA 70598

ABEAZLEY@ABEAZLEYARCHITECTURE.COM



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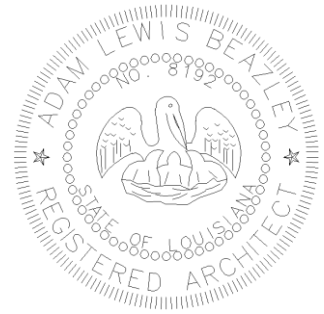
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(BID SET REVISION 1/26/26)



ARTICLE 1 - DEFINITIONS

- 1.1 The Bidding Documents include the following:
 - A. Invitation to Bidders
 - B. Instructions to Bidders
 - C. Proposal Form
 - D. General Conditions of the Contract for Construction, AIA Document A201-2017
 - E. Supplementary Conditions
 - F. Contract between Owner and Contractor, AIA Document A101-2017
 - G. Specifications (Project Manual)
 - H. Drawings
 - I. Addenda issued during the Bid period and acknowledged on the Proposal Form
- 1.2 All definitions set forth in the General Conditions of the Contract for Construction, AIA Document A-201, or in other Contract Documents are applicable to the Bidding Documents.
- 1.3 Addenda are written or graphic instruments issued by the Architect prior to the opening of Bids, which modify or interpret the Bidding Documents by additions, deletions, clarifications, or corrections.
- 1.4 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 Bidding Documents.
- 1.5 Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which work may be added or deducted by sums stated in Alternate Bids.
- 1.6 An Alternate Bid (or Alternates) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid, if the corresponding change in Project scope or materials or methods of construction described in the Bidding Documents, is accepted.
- 1.7 A Unit Price is an amount stated in the Bid as a price unit of measurement for materials or services as described in the Contract Documents.
- 1.8 A Bidder is one who submits a Bid for a prime contract with the Owner for the Work described in the proposed Contract Documents.
- 1.9 A Sub-Bidder is one who submits a Bid to Bidder for materials or labor for a portion of the Work. Sub-Bidders are bound by the provisions of these Instructions to Bidders for the content of their Bids.
- 1.10 A Proposal is a Bid as defined in 1.4 above.

ARTICLE 2 - BIDDER'S REPRESENTATION

- 2.1 The Bidder by making his Bid, represents that:
 - A. He has read and understands the Bidding Documents and his Bid is made in accordance therewith.
 - B. The Bid is made in compliance with the Bidding Documents.
 - C. Prime Bidders have visited the site and has familiarized himself with the local conditions under which the Work is to be performed and has correlated his personal observations with the requirements of the proposed Contract Documents.
 - D. His Bid is based upon the site and the materials, systems and equipment required by the Bidding Documents, without exceptions.

2.2 BIDDER QUALIFICATIONS

- A. 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 his Bid. In the State of Louisiana, only the Bids of Contractors and sub-contractors duly licensed under Louisiana Revised Statutes 37:2151, et seq. will be considered, if applicable. The Contractor shall be responsible for determining that all of his sub-bidders or prospective sub-contractors are duly licensed in accordance with law.

ARTICLE 3 - BIDDING DOCUMENTS

3.1 COPIES

- A. Complete Bidding Documents for this project are being distributed in electronic form on behalf of the Owner by Centerline BidConnect. They may be obtained without charge and without deposit from the Public Plan Room at www.centerlinebidconnect.com. Printed copies are not available from the Owner or Designer but arrangements can be made to obtain them through most reprographic firms. Plan holders are responsible for their own reproduction costs. Questions about this procedure shall be directed to:
 - 1. Centerline –Phone: 504-291-5738, Email: bidconnect@centerline.co.
 - 2. A Beazley Architecture – Phone: 337-849-3209, Email: abeazley@abeazleyarchitecture.com.
- B. Complete sets of Bidding Documents shall be used in preparing Bids; neither the Owner nor the Architect assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- C. The Owner and Architect may make copies of the Bidding Documents available on the above terms for the purpose of obtaining Bids on the Work. No license or grant of use is conferred by issuance of copies of the Bidding Documents.

3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

- A. The Bidder and sub-bidders shall carefully study and compare the Bidding Documents with each other, and with other work being Bid concurrently or presently under construction to the extent that it relates to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.
- B. Bidders and sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request to the Architect, to reach him at least seven (7) days prior to the date for receipt of Bids.
- C. Any interpretation, correction, or change of the Bidding Documents will be made by Addendum. Interpretations, corrections, or changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon such interpretations, corrections and changes.

3.3 SUBSTITUTIONS

- A. The materials, products, and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance, and quality to be met by any proposed substitution.
- B. No substitution will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least ten (10) days prior to the date for receipt of Bids. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed

substitution including drawings, performance and test data, and other materials, equipment or other portions of the Work, including changes in the work of other contracts that incorporation of the proposed substitution would require, shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

- C. If the Architect approves a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.
- D. Substitutions may be considered after the Contract award but only if they comply under the provisions of Section 01 25 00 "Substitution Procedures" or elsewhere in the Contract Documents.

3.4 ADDENDA

- A. Addenda will be transmitted to all who have registered with on the Architect's website and have received a complete set of Bidding Documents.
- B. Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.
- C. Addenda will be issued no later than seventy-two (72) hours prior to the date of receipt of Bids excluding Saturdays, Sundays and other legal holidays. An Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids may be issued at any time prior to the receipt of Bids.
- D. Each Bidder shall ascertain from the Architect prior to submitting his Bid, that he has received all Addenda issued and he shall acknowledge their receipt on the Proposal Form.

ARTICLE 4 - BIDDING PROCEDURE

4.1 FORM AND STYLE OF BIDS

- A. The Bidder shall submit Bids on the form included in the Contract Documents.
- B. All blanks on the Proposal Form shall be legibly executed in non-erasable medium ink.
- C. Where so indicated by the make-up of the Proposal Form, sums shall be expressed in both words and figures, and in case of discrepancy between the two, the amount written in words shall govern. Bids shall include applicable Sales and other taxes.
- D. Any interlineation, alteration, or erasure must be initialed by the signer of the Bid.
- E. All requested Alternates and Unit Prices shall be Bid. If no change in the Base Bid is required, enter "No Change".
- F. Where two (2) or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the Bid Security, state the Bidder's refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall make no additional stipulations on the Bid form nor qualify the Bid in any other manner.
- G. Each copy of the Bid shall state the legal name of the Bidder and the nature of legal form of the Bidder. The Bidder shall provide evidence of legal authority to perform within the jurisdiction of the Work. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a Contract. A Bid by a corporation shall further give the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder.
- H. The Contractor shall certify that he is licensed under R.S. 37:2151-2163 and show his license number (if his bid exceeds \$50,000.00) on the Bid, above his signature, or the signature of his duly authorized representative. His license number (if his Bid

exceeds \$50,000.00) shall also appear on the envelope.

4.2 BID SECURITY

A. **Not Applicable on this project**

4.3 SUBMISSION OF BIDS

- A. Bids shall be sealed in an opaque envelope and will be received until the time specified and at the place specified in the Invitation to Bid. It shall be the specific responsibility of the Bidder to deliver his sealed Bid to the address listed in the Invitation to Bid at the appointed place, and prior to the announced time for the opening of Bids. Late delivery of a Bid for any reason, including late delivery by U.S. Mail or other delivery service, shall disqualify the Bid. The Bid envelope shall be identified on the outside with the name of the project, and the name, address, and license number of the Bidder. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "Bid Enclosed" on the face thereof.
- B. Bids shall be deposited at the designated location prior to the time on the date for receipt of Bids indicated in the Request for Proposal, or any extension thereof made by Addendum. Bids received after the time and date for receipt of Bids, will be returned unopened.
- C. Bidder shall assume full responsibility for timely delivery at location designated for receipt of Bids.
- D. Oral, telephonic, facsimile, email or telegraphic Bids are invalid and will not receive consideration.

4.4 MODIFICATION OR WITHDRAWAL OF BID

- A. A Bid may not be modified, withdrawn, or canceled by the Bidder during the time stipulated in the Request for Proposal, for period following the time and date designated for the receipt of Bids, and Bidder so agrees in submitting his Bid.
- B. 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. Such notice shall be in writing over the signature of the Bidder. Written confirmation over the signature of the Bidder shall be received, and date and time stamped by the receiving party on or before the date and time set for receipt of Bids. A change shall be so worded as not to reveal the amount of the original Bid.
- C. Withdrawn Bids may be resubmitted to the time designated for the receipt of Bids, provided that they are then fully in conformance with these Instructions to Bidders.

ARTICLE 5 - CONSIDERATION OF BIDS

5.1 OPENING OF BIDS

- A. The Owner or Architect will open Bids privately at the time and location indicated in the Advertisement or Invitation to Bidders.

5.2 REJECTION OF BIDS

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

5.3 ACCEPTANCE OF BID (AWARD)

- A. It is the intent of the Owner to award a Contract to the Bidder provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. The Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's own best interests.
- B. The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in Article 9, and to determine the low Bidder on the basis of the sum of the Base Bid and the Alternates accepted.

ARTICLE 6 - POST-BID INFORMATION

6.1 CONTRACTOR'S QUALIFICATION STATEMENT

- A. Bidders to whom award of a Contract is under consideration, shall submit to the Architect upon request, a properly executed AIA Document A-305, Contractor's Qualification Statement, unless such a statement has been previously required and submitted as a prerequisite to the issuance of Bidding Documents.

6.2 OWNER'S FINANCIAL CAPABILITIES

- A. The Owner shall, at the request of the Bidder, to whom award of a Contract is under consideration, and no later than seven (7) days prior to the expiration of the time for withdrawal of Bids, furnish to the Bidder, reasonable evidence that the Owner has made financial arrangements to fulfill the Contract obligations under the Contract. Unless such reasonable evidence is furnished, the Bidder will not be required to execute the Owner - Contractor Agreement.

6.3 SUBMITTALS

- A. The Bidder shall, within seventy-two (72) hours of notification of selection for the award of a Contract for the Work, submit the following information to the Architect:
 - .1 A designation of the Work to be performed by the Bidder with his own forces.
 - .2 The proprietary names and the suppliers of principal items or systems of material and equipment proposed for the Work.
 - .3 A list of names of the subcontractors 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 (submit on AIA Document A-305).
- B. The Bidder will be required to establish to the satisfaction of the Architect and the Owner, 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 sub-contractors' respective trades.
- C. Prior to the award of the Contract, the Architect will notify the Bidder in writing if either the Owner or the Architect, after due investigation, has reasonable objection to any such proposed person or entity. If the Owner or Architect has reasonable objection to any such proposed person or entity, the Bidder may, at his option, (1) withdraw his

- Bid, or (2) submit an acceptable substitute person or entity with an adjustment in his Bid price to cover the difference in cost occasioned by such substitution. The Owner may, at his discretion, accept the adjusted Bid price, or he may disqualify the Bidder. In the event of either withdrawal or disqualification under this Sub-Paragraph, Bid Security will not be forfeited, notwithstanding the provisions of Paragraph 4.4.1.
- D. Persons and entities proposed by the Bidder and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

ARTICLE 7 - PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

7.1 BONDS NOT REQUIRED

ARTICLE 8 - FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

8.1 FORM TO BE USED

- A. Form of the Contract to be used shall be AIA Document A101-2017 Standard Form of Agreement Between Owner and Contractor where the basis of payment is a stipulated sum.

8.2 AWARD

- A. Before award of the Contract, the successful Bidder shall furnish to the Owner, 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.

ARTICLE 9 - COMPLETION TIME AND LIQUIDATED DAMAGES

- 9.1 The completion of the Contract must be within the time stated in the Advertisement or Invitation to Bidders, subject to such extensions as may be granted under Paragraph 8.3 Delays and Extensions of Time, in the General Conditions, or the Contractor will be subject to pay to the Owner Liquidated Damages, if so stated and required in the Invitation to Bidders and on the Proposal Form.

END OF SECTION 00 21 13

SECTION 004113 - BID FORM - STIPULATED SUM
(BID SET REVISION 1/26/26)

1.1 BID INFORMATION

A. Bidder: _____.

B. Project Name: **THE HARVEST CENTER CHURCH**

C. Project Location:

**THE HARVEST CENTER CHURCH
903 E SIMCOE ST.
LAFAYETTE, LOUISIANA 70501**

D. Owner:

**The Harvest Center Church
903 E Simcoe St.
Lafayette, Louisiana 70501**

E. Architect:

**A BEAZLEY ARCHITECTURE, LLC
104 Dairy Lane
Broussard, Louisiana 70518**

F. Architect Project Number: **2025-006**

1.2 CERTIFICATIONS AND BASE BID

A. Base Bid, Single-Prime (All Trades) Contract: The undersigned Bidder, having carefully examined the Procurement and Contracting Requirements, Conditions of the Contract, Drawings, Specifications, and all subsequent Addenda, as prepared by **A Beazley Architecture, LLC** and Architect's consultants, having visited the site, and being familiar with all conditions and requirements of the Work, hereby agrees to furnish all material, labor, equipment and services, including all scheduled allowances, necessary to complete the construction of the above-named Project, according to the requirements of the Bidding Documents, for the stipulated sum of:

1. _____ Dollars (\$_____).

2. The above amount may be modified by amounts indicated by the Bidder for any Allowances or Unit Prices indicated in the Bidding Documents.

1.3 TIME OF COMPLETION

A. The undersigned Bidder proposes and agrees hereby to commence the Work of the Contract Documents on a date specified in a written Notice to Proceed to be issued by Architect and shall fully complete the Work within the time stipulated in the Invitation to Bid.

1.4 ACKNOWLEDGEMENT OF LIQUIDATED DAMAGES

- A. The undersigned Bidder agrees hereby to pay the Owner Liquidated Damages as stipulated in the Invitation to Bid for any Work of the Contract Documents beyond the time stipulated in the Invitation to Bid, plus any extensions granted under Paragraph 8.3 Delays and Extensions of Time, in the General Conditions.

1.5 ACKNOWLEDGEMENT OF ADDENDA

- A. The undersigned Bidder acknowledges receipt of and use of the following Addenda in the preparation of this Bid:

1. Addendum No. 1, dated _____.
2. Addendum No. 2, dated _____.
3. Addendum No. 3, dated _____.
4. Addendum No. 4, dated _____.
5. Addendum No. 5, dated _____.
6. Addendum No. 6, dated _____.

1.6 ALTERNATES

- A. For any and all work required by the Bidding Documents for Alternates including any and all Allowances, and Unit Prices designated as alternates in the unit price description.
- B. Alternate No. 1: For all work required by the Bidding Documents for the work identified as Alternate No. 1, for the addition of the interior buildout of Phase 2, ADD the lump sum of: _____ Dollars (\$_____).
- C. Alternate No. 2: For all work required by the Bidding Documents for the work identified as Alternate No. 2, for the demolition of existing light weight concrete deck and formboard and the addition of new B-deck across the entire roof structure, ADD the lump sum of: _____ Dollars (\$_____).

1.7 CONTRACTOR'S LICENSE

- A. The undersigned further states that it is a duly licensed Contractor, for the type of work proposed, in in the state where the Project is located, and that all fees, permits, etc., pursuant to submitting this proposal have been paid in full.

1.8 SUBMISSION OF BID

- A. Respectfully submitted this ____ day of _____, 2024.
- B. Submitted By: _____ (Name of bidding firm or corporation).
- C. Authorized Signature: _____ (Handwritten signature).
- D. Signed By: _____ (Type or print name).

- E. Title: _____ (Owner/Partner/President/Vice President).
- F. Witness By: _____ (Handwritten signature).
- G. Title: _____ (Corporate Secretary or Assistant Secretary).
- H. Street Address: _____.
- I. City, State, Zip: _____.
- J. Phone: _____.
- K. License No.: _____.
- L. Federal ID No.: _____ (Affix Corporate Seal Here).

END OF SECTION

SECTION 00 72 00 - GENERAL CONDITIONS AND SUPPLEMENTARY CONDITIONS

GENERAL CONDITIONS

STANDARD AIA FORMS: General Conditions of the Contract for Construction, **AIA Document A201 - 2017 Edition** of The American Institute of Architects are hereby made a part of this specification to the same extent as if bound herein. The General Conditions, including Supplementary Conditions and other Division 1 Sections herein shall become a part of the Contract and shall apply to all Contractors and Subcontractors. Copies of the General Conditions may be examined at the Architect's office or obtained from The American Institute of Architects, Washington, D.C. 20006, or AIA Louisiana, 521 America Street, Baton Rouge, Louisiana 70802.

SUPPLEMENTARY CONDITIONS

The following supplements modify the "General Conditions of the Contract for Construction", AIA Document A201-2017. Where a portion of the General Conditions is modified or deleted by these Supplementary Conditions, the unaltered portions of the General Conditions shall remain in effect.

ARTICLE 1 - GENERAL PROVISIONS**§1.2 Correlation and Intent Of The Contract Documents**

Add the following Section 1.2.1.2 to Section 1.2.1:

§1.2.1.2 In the event of conflicting or differing requirements between Contract Documents that have not been clarified or changed by Addendum or Change Order, the Contractor shall provide the better quality, greater quantity or more stringent requirement unless directed otherwise by the Architect."

Add the following Section 1.2.4 to Section 1.2

§1.2.4 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to and govern the execution of the work of all Sections of the Specifications.

Add the following Section 1.9 to Article 1:

§1.9 Recordation Of Contract

Where the project is located in a parish of the State of Louisiana, the Contractor, at his own expense, shall record the Notice of Contract and bond or bonds required with the Clerk of Court or the Recorder of Mortgages of that parish before the work commences. Contractor shall give the book number and folio where they are recorded to the Architect in writing, as a formal communication.

ARTICLE 2 - OWNER**§2.3 Information and Services Required Of The Owner**

Delete Section 2.3.6 and substitute the following:

§2.3.6 The Contractor will be furnished, free of charge, digital copies of the Contract Documents. The Contractor shall bear the cost of any copies and/or the cost of reproduction, postage, and handling.

ARTICLE 3 - CONTRACTOR

§3.2 Review Of Contract Documents and Field Conditions By Contractor

Add the following Section 3.2.5 to Section 3.2:

§3.2.5 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for evaluating and responding to the Contractor's requests for information that are not prepared in accordance with the Contract Documents or where the requested information is available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner-provided information, Contractor-prepared coordination drawings, or prior Project correspondence or documentation.

§3.4 Labor and Materials

Add the following Sections 3.4.2.1 and 3.4.2.2 to Section 3.4.2:

§3.4.2.1 After the Contract has been executed, the Owner and Architect will consider requests for the substitutions of products in place of those specified only under the conditions set forth in the General Requirements (Division 1 of the Specifications). By making requests for substitutions, the Contractor:

- .1 represents that he has personally investigated the proposed substitute product and has determined that it is equal or superior in all respects to that specified;
- .2 represents that he will provide the same warranty for the substitution as would have been provided for the product specified;
- .3 certifies that the cost data presented is complete and includes all related costs for the substituted product and for Work that must be changed as a result of the substitution, except for the Architect's redesign costs and waives all claims for additional costs related to the substitution that subsequently became apparent; and
- 4 shall coordinate the installation of the accepted substitution, making such changes as may be required for the Work to be complete in all respects.

§3.4.2.2 The Owner shall be entitled to reimbursement from the Contractor for amounts paid to the Architect for reviewing the Contractor's proposed substitutions and making agreed-upon changes in the Drawings and Specifications resulting from such substitutions.

§3.7 Permits, Fees, Notices and Compliance With Laws

Add the following Section 3.7.1.1 to Section 3.7.1:

§3.7.1.1 The Owner has paid for the initial cost of plan review fees by the authorities having jurisdiction over the Project.

Add the following Section 3.7.5.1 to Section 3.7.5:

§3.7.5.1 The Contractor shall follow all procedures mandated by State and Federal law, including but not limited to L.R.S. 8:671 et seq., R.S. 49:213.1 et seq., and Sections 401 and 404 of the Federal Clean Water Act.

Add Sections 3.7.6 and 3.7.7 to Section 3.7:

§3.7.6 The Contractor shall 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 requesting plans or submitting his bid. The Contractor shall be responsible for determining that all of his Subcontractors or prospective Subcontractors are duly licensed in accordance with the law.

§3.7.7 The requirements of subparagraphs 3.7.2, 3.7.3 and 3.7.4 do not waive the Contractor's responsibility of complying with the requirements of the Contract Documents when such requirements exceed those of any laws, codes, ordinances, rules, regulations and lawful orders of any public authority bearing on the work.

§3.9 Superintendent

Add the following Section 3.9.1.1 to Section 3.9.1:

§3.9.1.1 The Superintendent shall transmit directions and communications to Subcontractors and follow through on the accomplishment of any directions contained in said communications."

§3.13 Use Of Site

Add the following to the end of Section 3.13:

"Specific requirements regarding site access, points of ingress and egress, Areas of permitted use or areas not permitted for use by the Contractor, as well as allowable working hours, are included in Section 01 10 00 - Summary.

§3.12 Shop Drawings, Product Data and Samples

Add Section 3.12.11 to Section 3.12:

§3.12.11 The Architect's review of Contractor's submittals will be limited to examination of an initial submittal and one (1) resubmittal. The Owner is entitled to obtain reimbursement from the Contractor for amounts paid to the Architect for evaluation of additional re-submittals.

ARTICLE 4 – ARCHITECT

§4.2 Administration Of The Contract

Delete Section 4.2.10 and substitute the following:

§4.2.10 The Owner and the Architect have agreed that the Architect will provide construction phase services as described in Paragraph 4.2 up to the limits stipulated in Section 01 10 00 - Summary. Should these limits be exceeded due to the failure of the Contractor to perform the work in accordance with the Contract Documents, defects and deficiencies in the Work, failure to complete the work within thirty (30) days of the date of a notification to correct work, or failure to complete work identified or by the Certificate of Substantial Completion within thirty (30) days. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architects for additional services.

ARTICLE 5 - SUBCONTRACTORS

§5.2 Award Of Subcontractors and Other Contracts For Portions Of Work

Delete Section 5.2.1 and substitute the following:

§5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor shall at the Preconstruction Conference furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. Failure of the Owner or Architect to reply within the 14-day period shall constitute notice of no reasonable

objection.

Add the following Section 5.2.4.1 to Section 5.2.4:

§5.2.4.1 The Contractor shall notify the Owner when a Subcontractor is to be changed and substituted with another Subcontractor.

ARTICLE 7 - CHANGES IN THE WORK

§7.1 General

Add the following Sections 7.1.4, 7.1.5 and 7.1.6 to Section 7.1:

§7.1.4 Unless stated otherwise in the Agreement, the combined overhead and profit included in the total cost to the Owner for a change in the Work shall be based on the following schedule:

- .1 For the Contractor, for Work performed by the Contractor's own forces, a percentage of the cost as stipulated in the Owner/Contractor Agreement.
- .2 For the Contractor, for Work performed by the Contractor's Subcontractors, a percentage of the amount due the Subcontractors as stipulated in the Owner/Contractor Agreement.
- .3 For each Subcontractor involved, for Work performed by that Subcontractor's own forces, ten percent (10%) of the cost.
- .4 For each Subcontractor involved, for Work performed by the Subcontractor's Sub-subcontractors, five percent (5%) of the amount due the Sub-subcontractor.
- .5 Cost to which overhead and profit is to be applied shall be determined in accordance with Section 7.3.4.
- .6 In order to facilitate checking of quotations for extras or credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including labor, materials and Subcontracts. Labor and materials shall be itemized in the manner prescribed above. Where major cost items are Subcontracts, they shall also be itemized.

§7.1.5 Whenever total cost of changes exceeds ten percent (10%) of the original Contract sum, Contractor shall obtain a "Consent of Surety" from the Bonding Company that issued the Performance and Payment Bonds, to assure coverage of the extra work.

§7.1.6 The Contractor will be due extended overhead for time delays only when complete stoppage of work occurs causing a contract completion extension. The stoppage must be due to acts or omissions solely attributable to the Owner. Extended overhead will not be considered for delays due to Acts of God in accordance with the provisions of Article 15.

§7.3 Construction Change Directives

Revise Section 7.3.4 as follows:

In the first sentence, delete the words, "if no such amount is set forth in the Agreement, a reasonable amount" and substitute "an allowance for overhead and profit in accordance with clauses 7.1.4 above".

ARTICLE 9 - PAYMENTS AND COMPLETION

§9.3 Applications For Payment

Delete Section 9.3.1 and substitute the following:

§9.3.1 Monthly, the Contractor shall submit to the Architect an Application and 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 notarized, submitted on or about the first (1st) of each month for the value of labor and materials incorporated into the Work and of materials suitably stored, as of the twenty-fifth (25th) day of the preceding month, less normal retainage as follows, per R.S.38:2248:

Add Sections 9.3.1.3 and 9.3.1.4 to Section 9.3.1:

§9.3.1.3 Until Substantial Completion, the Owner will pay ninety percent (90%) of the amount due the Contractor on account of progress payments for projects with a Contract price of up to \$500,000.00 or ninety-five percent (95%) of the amount due the Contractor on account of progress payments for projects with a Contract price of \$500,000.00 or more.

§9.3.1.4 The normal retainage shall not be due the Contractor until after Substantial Completion and expiration of the lien period and submission to the Architect of a Lien and Privilege certificate and invoice for retainage.

§9.7 Failure of Payment

Add the following Section 9.7.1 to Section 9.7:

§9.7.1 The provisions of Section 9.7 shall not apply after expiration of Contract Time.

§9.8 Substantial Completion

Add Section 9.8.3.1 to Section 9.8.3:

§ 9.8.3.1 The Architect will perform no more than two (2) inspections to determine whether the Work or a designated portion thereof has attained Substantial Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for any additional inspections.

Add the following Sections 9.8.4.1 and 9.8.4.2 to Section 9.8.4:

§9.8.4.1 The Architect shall prepare a "Punch List" to accompany the Certificate of Substantial Completion listing incomplete Work or defective Work to be completed by the Contractor prior to Final Payment. This list shall include all items included on the Contractors list provided under Section 9.8.2 plus any additional incomplete or unacceptable items identified by the Architect. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all the work in accordance with the Contract Document nor does it deprive the Owner of his right to withhold payment for additional incomplete or unacceptable items identified prior to making final payment.

§9.8.4.2 The Architect shall assign a monetary value to each item on the Punch List representing the estimated cost mobilization, labor, materials, equipment, taxes, profit and overhead. The cost of incomplete items contained in this list shall be withheld from future payments until completed as described below.

Delete Section 9.8.5 and substitute the following:

§9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and the Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance and consent of surety, if any, the Contractor may invoice for the full Contract amount or designated portion thereof less the full amount of the retainage required by Section 9.3.1.3 and less the full monetary value of the Punch List of incomplete or defective work required by Sections 9.8.4.1 and 9.8.4.2.

Add Sections 9.8.6, 9.8.7 and 9.8.8 to Section 9.8:

§9.8.6 In Louisiana and in those states having statutes relating to liens on private and public works similar to those in Louisiana, upon Substantial Completion of the Work and upon the recommendations of the Architect, the Owner shall accept the work in accordance with Certificate of Substantial Completion, AIA Document G704, and the provisions, as amended, of Louisiana R.S. 9:4802.1 (as to private works). The Owner shall sign the Certificate of Substantial Completion of the Work and the Contractor shall cause the Certificate to be recorded in the mortgage office of the parish in which the work has been done. The Contractor shall notify the Owner and Architect of the number and folio where said Certificate is recorded. Issuance of the Certificate of Substantial Completion does not constitute final acceptance.

§9.8.7 In Louisiana, and in those states having statutes relating to liens on private and public works similar to those in Louisiana, neither the final payment nor any part of the retained percentage shall become due until the Contractor shall deliver to the Owner a certificate by the Clerk of Court in the parish in which the project is located, that the Owner's Substantial Completion Certificate has been recorded, more than thirty (30) days has elapsed since the recordation in the case of private works, and more than forty-five (45) days has elapsed since the recordation in the case of public works, and no liens have been recorded affecting this property.

§9.8.8 Upon completion of the lien period and submission of a Lien and Privilege Certificate, the Contractor may apply for payment of lien retainage and for the value of any 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 accepted as Substantially Complete. If funds remaining are less than that required to complete the Work, the Contractor shall pay the difference.

§9.10 Final Completion and Final Payment

Add Section 9.10.1.1 to Section 9.10.1:

§9.10.1.1 The Architect will perform no more than two (2) inspections to determine whether the Work or a designated portion thereof has attained Final Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for any additional inspections.

ARTICLE 11 - INSURANCE AND BONDS

§11.1 Contractor's Insurance and Bonds

Renumber Section 11.1.2 and 11.1.3 to 11.1.9 and 1.1.10 respectively and insert new Section 11.1.2 to Section 11.1:

§ 11.1.2 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed including private entities performing Work at the site and exempt from the coverage on account of number of employees or occupation, which entities shall maintain voluntary compensation coverage at the same limits specified for mandatory coverage for the duration of the Project;
- .2 Claims

Add Sections 11.1.3, 11.1.4, 11.1.5, 11.1.6, 11.1.7 and 11.1.8 to Section 11.1 as follows:

§ 11.1.3 The insurance required by Section 11.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§11.1.4 The limits for Worker's Compensation and Employer's Liability insurance shall meet statutory limits mandated by State and Federal Laws except that Employer's Liability shall not be less than the following:

- .1 \$1,000,000 Per Accident,
- .2 \$1,000,000 Disease, Policy Limit and
- .3 \$1,000,000 Disease, each Employee

§11.1.5 The limits for Commercial General Liability insurance including coverage for Premises-Operations, Independent Contractors' Protective, Products-Completed Operations, Contractual Liability, Personal Injury and Broad Form Property Damage (including coverage for Explosion, Collapse and Underground Hazards) shall be as follows:

Combined Single Limit (CSL) – Amount of Insurance Required

Type of Construction	Projects under \$100,000	Projects \$100,001-\$1,000,000	Projects over \$1,000,000

New Buildings: For the construction Contract amount

Each Occurrence/ Minimum Limit	\$500,000	\$1,000,000	\$3,000,000
Aggregate (Applicable to this Contract only)	\$500,000	\$1,000,000	\$3,000,000

Renovations: For the sum of the construction Contract amount and the value of the existing building as computed below

Each Occurrence/ Minimum Limit	\$500,000*	\$1,000,000*	\$3,000,000*
Aggregate (Applicable to this Contract only)	\$500,000*	\$1,000,000*	\$3,000,000*

A minimum combined single limit of \$500,000 is required for all renovations. The value for the existing building as stated in the Advertisement for Bids shall be multiplied by 10% and added to the construction Contract amount to determine insurance requirements. The maximum insurance limit required is \$5,000,000.00

§11.1.6 Business Automobile Liability Insurance with a combined single limit of \$1,000,000 per occurrence for bodily injury and property damage, unless otherwise indicated. This insurance shall include for bodily injury and property damage the following coverages:

- .1 Owned automobiles;
- .2 Hired automobiles;
- .3 Non-owned automobiles.

§11.2.7 An Umbrella Policy may be used to meet minimum requirements.

§11.1.8 The Contractor/Subcontractor, prior to commencing work, shall provide at his own expense, proof of the following insurance coverages required by the Contract to the Owner in insurance companies authorized in the State of Louisiana. Insurance is to be placed with insurers with an A. M. Best's rating of no less than A-:VI. This rating requirement will be waived for the Worker's Compensation coverage. On the Certification of Insurance, under the description of operations, the following wording is required: The aggregate loss limit applies to each project, or a copy of ISO form CG2503 (current form approved for use in Louisiana) shall be submitted. If this insurance is written on a Commercial General Liability policy form, the certificates shall be ACORD Form 25-S, completed and supplemented in accordance with AIA Document G715™-Instruction Sheet and Supplemental Attachment for ACORD Certificate of Insurance 25-S.

§11.2 Owner's Insurance

Delete section 11.2.1 and 11.2.2 and substitute the following Section 11.2.1:

§11.2.1 Owner's Protective Liability Insurance shall be furnished by the Contractor naming the Owner as the insured. Limits of Coverage shall be as follows:

	Projects under \$1,000,000	Projects \$100,001- \$1,000,000	Projects over \$1,000,000
CSL – Each Occurrence	\$500,000	\$1,000,000	\$3,000,000

Delete Section 11.3 entirely and substitute the following Sections 11.3.1, 11.3.1.1, 11.3.1.2, 11.3.1.3, and 11.3.1.4:

§11.3 Property Insurance

§ 11.3.1 The Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk, "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Contractor has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, Contractor, Subcontractors, Sub-subcontractors, Architect, and Architect's Consultants in the Project. If the Owner is damaged by the failure of the Contractor to purchase and maintain such insurance without so notifying the Owner in writing, then the Contractor shall bear all reasonable costs attributable thereto.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the property insurance requires deductibles, the Contractor shall pay costs not covered because of such deductibles.

§ 11.3.1.3 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.4 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

Renumber Sections 11.3, 11.4, and 11.5 to 11.4, 11.5, and 11.6 and add the following Section 11.4:

§11.4 Performance Bond and Payment Bond

§11.4.1 If so stated by the Advertisement or Invitation for Bids, the Contractor shall furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder. Bonds may be obtained through the Contractor's usual source and the cost thereof shall be included in the Contract Sum. The amount of each bond shall be equal to one hundred percent (100%) of the Contract Sum.

§11.4.1.1 The Contractor shall deliver the required bonds to the Owner within 5 calendar days following the execution of the Contract; or if the Work is to be commenced prior thereto in response to a letter of intent, the Contractor shall, prior to the commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished.

§11.4.1.2 The Contractor shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the Power of Attorney.

ARTICLE 12 – UNCOVERING AND CORRECTION OF WORK

§12.2.2 After Substantial Completion

Add the following to Section 12.2.2.3:

"Upon request by the Owner and prior to the expiration of one (1) year from the date of Substantial Completion, the Architect will conduct and the Contractor shall attend a meeting with the Owner to review the facility operations and performance".

Add the following Section 12.2.6 to 12.2:

§12.2.6 The corrective remedies set forth in this Section 12.2 are not exclusive and shall not deprive the Owner of any action right or remedy otherwise available to it for breach of any of the provisions of the Contract Documents and for any damages suffered by Owner as a result of such defects in the Work.

ARTICLE 13 – MISCELLANEOUS PROVISIONS

Add the following Sections 13.6, 13.7 and 13.8 to Article 13:

§13.6 Time Limits on Claims

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

§13.7 Equal Opportunity

The Contractor and the Contractor's Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin or age. 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, national origin or age. 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.

§13.8 Confidential Information

If the Owner or Contractor receives information specifically designated by the other party as "confidential" or "business proprietary," the receiving party shall keep such information strictly confidential and shall not disclose it to any other person except to (1) those who need to know the content of such information in order to perform services or construction solely and exclusively for the Project, including its employees, or (2) its consultants and contractors whose contracts include similar restrictions on the use of confidential information. However, the party receiving "confidential" or "business proprietary" information may disclose such information, after seven (7) days' Notice to the party providing the confidential or business proprietary information, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by arbitrator(s) order. Notice shall be provided, and deemed to have been duly served, in accordance with § 1.6.2 of A201-2017.

ARTICLE 14 - TERMINATION OR SUSPENSION OF THE CONTRACT

Add the following Section 14.1.2.5 to Section 14.2.1:

“.5 Failure to complete the Punch List within the time period allowed in the Certificate of Substantial Completion”.

Add the following Section 14.2.5 to 14.2:

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

§14.4 Termination By The Owner For Convenience

Delete Sections 14.4.1, 14.4.2 and 14.4.3 and replace with new Sections 14.4.1, 14.4.2 and 14.2.3:

§14.4.1 The Owner may, at any time, terminate the Contract in whole or in part for the Owner's convenience and without cause. Termination by the Owner under this Section 14.4 shall be by a Notice of Termination delivered to the Contractor, specifying the extent of termination and the effective date.

§14.4.2 Upon receipt of a Notice of Termination, the Contractor shall immediately, in accordance with instructions from the Owner, proceed with performance of the following duties regardless of delay in determining or adjusting amounts due under the Section 14.4:

- .1 cease operations as specified in the notice;
- .2 place no further orders and enter into no further subcontracts for materials, labor, services or facilities, except as necessary to complete portions of the Contract not terminated;
- .3 terminate all subcontracts and orders to the extent they relate to the Work terminated;
- .4 proceed to complete the performance of Work not terminated; and
- .5 take action that may be necessary or that the Owner may direct for the protection and preservation of the terminated work.

§14.4.3 The amount to be paid to the Contractor by the Owner because of the termination shall consist of:

- .1 amounts due for Work performed and for Work in process on or off the site to the extent completed on the terminated portion of the Contract before the effective date, the cost of that Work and the expense of settling and paying termination costs under the terminated subcontracts and purchase orders that are properly chargeable to the terminated portion of the Contract;
- .2 the reasonable costs of settlement of the Work terminated, including accounting, legal, clerical and other expenses reasonable necessary for the preparation of termination settlement proposals and supporting data; additional costs of termination and cancellation charges and settlement of subcontracts not already allowed under Section 14.4.3.1; and storage, transportation and other costs incurred which are reasonable necessary for the preservation, protection or disposition of the terminated Work; and
- .3 a fair and reasonable profit of the Work actually completed as of the date of termination, but in no event will any anticipated profits be paid.

Add Sections 14.4.4, 14.4.5 and 14.2.6 to Section 14.2:

§14.4.4 Allowance shall be made for previous payments to the Contractor for the terminated portion of the Work,
and Claims settled or pending under ARTICLE 4 between the Owner and Contractor, and for the value of materials, supplies, equipment and other items that are part of the cost of the Work to be disposed of by the Contractor.

§14.4.5 The term “cost” as used in this Section 14.4, shall be as listed in Section 7.3.7.

§14.4.6 If Contractor is terminated by the Owner for cause pursuant to Section 14.2, and it is later determined that such termination was not justified; the termination will be converted into a termination for convenience for all purposes.

ARTICLE 15 CLAIMS AND DISPUTES

§15.1 Claims

Add the following to the end of Section 15.1.3.1:

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

Add the following to the end of Section 15.1.5:

“An increase in the Contract time due to weather shall not be cause for an increase in the Contract sum”.

Add the following Sections 15.1.6.2.1 and 15.1.6.2.2 to Section 15.1.6.2:

§15.1.6.2.1 The Contractor shall ask for total adverse weather days. The Contractor’s request shall be considered only for days over the allowable number of days stated below. The following are considered reasonably anticipated days of adverse weather on a monthly basis:

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

§15.1.6.2.2 Request for delays due to weather shall be considered only if the weather event actually caused stoppage of the Work. Weather events on days when no work was scheduled will not be considered to be a delay.

Add the following Sections 15.1.6.3 and 15.1.6.4 to Section 15.1.6:

§15.1.6.3 Claims for increase in the Contract Time shall set forth in detail the circumstances that form the basis for the Claim, the date upon which each cause of delay began to affect the progress of the Work, the date upon which each cause of delay ceased to affect the progress of the Work and the number of days' increase in the Contract Time claimed as a consequence of each such cause of delay. The Contractor shall provide such supporting documentation as the Owner may require including, where appropriate, a revised construction schedule indicating all the activities affected by the circumstances forming the basis of the Claim.

§15.1.6.4 The Contractor shall not be entitled to a separate increase in the Contract Time for each one of the number of causes of delay which may have concurrent or interrelated effects on the progress of the Work, or for concurrent delays due to the fault of the Contractor.

Add the following paragraph to the end of Section 15.1.7:

If, before expiration of thirty (30) days from the date of execution for this Agreement, the Owner obtains by separate agreement and furnishes to the Contractor a similar mutual waiver of all claims from the Architect against the Contractor for consequential damages which the Architect may incur as a result of any act or omission of the Owner or Contractor, then the waiver of consequential damages by the Owner and Contractor contained in this Section 15.1.7 shall be applicable to claims by the Contractor against the Architect.

§15.2 Initial Decision

Delete Section 15.2.1 and substitute the following:

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

Delete Section 15.2.6 and substitute the following:

§15.2.6 If mediation is permitted by the Agreement through mutual agreement by the Owner and the Contractor, either party may file a request for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1..

Delete Section 15.2.6.1 and substitute the following

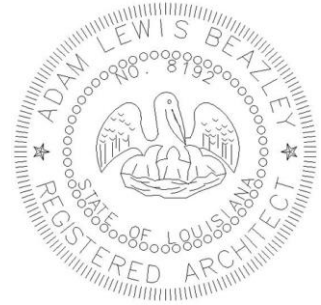
§15.2.6.1 If the parties have selected mandatory mediation as a method of dispute resolution in the Agreement, either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving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

§15.3 Mediation

Delete Section 15.3.1 and substitute the following:

§15.3.1 If the parties have selected mediation as a method of dispute resolution in the Agreement, or have mutually agreed to subject individual claims to mediation, any Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to other methods of dispute resolution.

END OF SECTION 00 72 00



SECTION 01 09 00 - DEFINITIONS AND STANDARDS

PART 1- GENERAL

RELATED DOCUMENTS: Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 specification sections apply to this section.

SUMMARY: This section specifies administrative requirements for compliance with governing regulations, codes and standards. Requirements include obtaining permits, licenses, inspections, releases and similar documentation, as well as payments, statements and similar requirements associated with regulations, codes and standards. Refer to General and Supplementary Conditions for requirements for compliance with governing regulations.

DEFINITIONS:

General: Definitions contained in this section are not necessarily complete, but are general to the extent that they are not defined more explicitly elsewhere in the Contract Documents.

Indicated: Indicated refers to graphic representations, notes or schedules on the Drawings, or other paragraphs or schedules in specifications, and similar requirements in Contract Documents. Where terms such as "shown", "noted", "scheduled", and "specified" are used, it is to help locate the reference; no limitation on location is intended except as specifically noted.

Directed: Terms such as "directed", "requested", "authorized", "selected", "approved", "required", and "permitted" mean "directed by the Architect", "requested by the Architect", and similar phrases. However, no implied meaning shall be interpreted to extend the Architect's responsibility into the Contractor's area of construction supervision.

Approve: The term "approved", where used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the responsibilities and duties of the Architect stated in General and Supplementary Conditions. Such approval shall not release the Contractor from responsibility to fulfill Contract Document requirements, unless otherwise provided in the Contract Documents.

Regulation: The term "Regulations" includes laws, statutes, ordinances, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions and agreements within the construction industry that control performance of the Work, whether they are lawfully imposed by authorities having jurisdiction or not.

Furnish: The term "furnish" is used to mean "supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations."

Install: The term "install" is used to describe operations at Project site including the actual "unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations."

Provide: The term "provide" means "to furnish and install, complete and ready for the intended use."

Installer: An "installer" is an entity engaged by the Contractor, either as an employee, subcontractor or sub-subcontractor for performance of a particular construction activity, including installation, erection, application and similar operations. Installers are required to be experienced in the operations they are engaged to perform.

Project Site: The "Project site" is the space available to the Contractor for performance of the Work, either exclusively or in conjunction with others performing other construction as part of the Project. The extent of the Project site is shown on the Drawings and may or may not be identical with the description of the land upon which the Project is to be built.

Testing Laboratories: A "testing laboratory" is an independent entity engaged to perform specific inspections or tests, either at the Project site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

SPECIFICATION FORMAT AND CONTENT EXPLANATION: This section is provided to help the user of these specifications understand the format, language, implied requirements, and similar conventions. None of the explanations shall be interpreted to modify the substance of Contract requirements.

Specification Format: These specifications are organized into divisions, sections or trade headings based on the Construction Specifications Institute's 50 Division format and the MASTERFORMAT numbering system. This organization conforms generally to recognized construction industry practice.

Specification Content: This specification has been produced employing conventions in the use of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

Language used in the specifications and other Contract Documents is the abbreviated type. Implied words and meanings will be appropriately interpreted. Singular words will be interpreted as plural and plural words interpreted as singular, where applicable, and where the full context of the Contract Documents so indicates.

Imperative Language is used generally in the specifications. Requirements expressed imperatively are to be performed by the Contractor. At certain locations in the text, for clarity, subjective language is used to describe responsibilities which must be fulfilled indirectly by the Contractor, or by others when so noted.

Assignment of Specialties: The specification requires that certain specific construction activities shall be performed by specialists who are recognized experts in the operations to be performed. The specialists must be engaged for those activities, and the assignments are requirements over which the Contractor has no choice or option. Nevertheless, the ultimate responsibility for fulfilling Contract requirements remains with the Contractor.

This requirement shall not be interpreted to conflict with enforcement of building codes and similar regulations governing the Work. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.

Trades: Use of titles such as "carpentry" is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter". It also does not imply that the requirements specified apply exclusively to tradespersons of the corresponding generic name.

DRAWINGS SYMBOLS: Graphic symbols used on the Drawings are those recognized in the construction industry for purposes indicated. Where not otherwise noted, symbols are defined by "Architectural Graphic Standards", published by John Wiley & Sons, Inc., seventh edition. Special symbols are as noted on Drawings.

Mechanical/Electrical Drawings: Graphic symbols used on mechanical and electrical drawings are generally aligned with symbols recommended by ASHRAE. Where appropriate, they are supplemented by more specific symbols recommended by technical associations including ASME, ASPE, IEEE and similar organizations. Refer instances of uncertainty to the Architect for clarification before proceeding.

INDUSTRY STANDARDS:

Applicability of Standards: Except where Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into Contract Documents by reference. Individual sections indicate which codes and standards the Contractor must keep available at the project site for reference.

Referenced Standards: Referenced standards take precedence over standards that are not referenced but recognized in the construction industry as applicable.

Unreferenced standards: Except as otherwise limited by the Contract Documents, standards not referenced but recognized in the industry as applicable will be enforced for performance of the Work. The Architect will decide whether a code or standard is applicable, or which of several are applicable.

Publication Dates: Where compliance with an industry standard is required, comply with standard in effect as of date of Contract Documents.

Conflicting Requirements: Where compliance with two (2) or more standards is specified and they establish different or conflicting requirements for minimum quantities or quality levels, the most stringent requirement will be enforced, unless the Contract Documents indicate otherwise. Refer requirements that are different but apparently equal, and uncertainties as to which quality level is more stringent to the Architect for a decision before proceeding.

Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to that entities' construction activity. Copies of applicable standards are not bound with the Contract Documents.

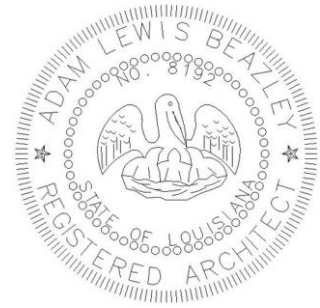
Where copies of standards are needed for performance of a required construction activity, the Contractor shall obtain copies directly from the publication source. Although copies of standards needed for enforcement of requirements may be part of required submittals, the Architect reserves the right to require the Contractor to submit additional copies as necessary for enforcement of requirements.

Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where acronyms or abbreviations are used in the specifications or other Contract Documents, they mean the recognized name of the trade association, standards generating organization, authority having jurisdiction, or other entity applicable to the context of the test provision. Refer to the "Encyclopedia of Associations" published by Gale Research Company, available in most libraries.

Federal Government Agencies: Name and titles of federal government standard or specification producing agencies are frequently abbreviated. Where acronyms or abbreviations are referenced in the Contract Documents, indicate names of standard or specification producing agencies of the federal government. A list of names and addresses where information might be obtained may be reviewed in the Architect's office.

END OF SECTION 01 09 00

SECTION 01 10 00 – SUMMARY
(BID SET REVISION 1/26/26)



PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Project information.
 - 2. Work covered by Contract Documents.
 - 3. Work by Owner.
 - 4. Access to site.
 - 5. Coordination with occupants.
 - 6. Work restrictions.
 - 7. Specification and drawing conventions.
 - 8. Miscellaneous provisions.
- B. Related Requirements:
 - 1. Division 1 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

- A. Project Identification: Harvest Community Center – Nehemiah Project
 - 1. Project Location: 819 E Simco, Lafayette, LA 70501.
- B. Owner: Harvest Center Church.
 - 1. Owner's Representative: Pastor Daniel Kelly.
- C. Architect: A Beazley Architecture LLC, Adam Beazley, 104 Dairy Lane, Broussard, LA 50518, 337.849-3209, abeazley@abeazleyarchitecture.com
- D. Architect's Consultants: The Architect has retained the following design professionals who have prepared designated portions of the Contract Documents:
 - 1. MECHANICAL: Ritter Consulting Engineers, Andrea Manceaux, 2014 W. Pinhook Rd Suite 200, Lafayette, LA 70508, 337.984.8498, Andrea@Ritterconsultingengineers.com.
 - 2. ELECTRICAL: EDS Inc, Raul Valdes, 13430 N Leah Street, Ste B, Gonzales, LA 70737, 844.337.1990, Raul@ewithd.com.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and includes the repairs, renovations, and alterations to existing building to provide new church assembly spaces:
1. Structural drop-off canopy.
 2. Exterior aluminum cladding.
 3. Exterior site construction and plantings.
 4. Concrete cutting and footings in existing building.
 5. Exterior doors, frames and hardware.
 6. Interior doors, frames and hardware.
 7. Carpet tile flooring and rubber base.
 8. Concrete floor and finishing.
 9. Finished wood slat wall systems.
 10. Acoustic lay-in ceilings.
 11. Acoustical fabric covered wall panels.
 12. Plastic laminate counters and cabinets.
 13. Quartz Countertops.
 14. Toilet partitions and accessories.
 15. Millwork and accessories.
 16. Raceways and Conduit for audio, video and theatrical lighting.
 17. Plumbing fixtures and sanitary sewer systems.
 18. HVAC systems.
 19. Electrical lighting, power and data systems.
 20. Sprinkler and fire alarm systems.
 21. Structural steel and steel roof deck.
 22. Glazed aluminum storefront and entrances.
- B. Type of Contract:
1. Project will be constructed under a single Prime Contract.
 2. Contract Form: AIA Document A101, 2017 Edition with Supplemental Conditions reprinted herein.

1.5 PHASING OF THE WORK

- A. Not Applicable

1.6 SCHEDULE

- A. General: The Contractor shall complete the construction within the scheduled time listed below. The Contractor's Project Schedule shall include the following non-negotiable milestone dates.
- B. Substantial Completion shall be completed within two-hundred seventy-five (275) days from Notice to Proceed.

1.7 WORK BY OWNER

- A. General: Cooperate fully with Owner so Work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

- B. Work by Owner: Owner will furnish products indicated. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products and making building services connections.
 - 1. Video equipment, audio equipment, and theatrical lighting shall be furnished and installed by Owner (OFOI).

1.8 ACCESS TO SITE

- A. General: Contractor shall have unlimited use of Project site for construction operations as indicated by requirements of this Section.
- B. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - 1. Driveways, Walkways and Entrances: Keep driveways and entrances serving premises clear and available to Owner, Owner's employees, Lessees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
 - 2. Provide temporary fencing separating existing occupied lease space from construction site.
- C. Space south of the building, in the existing parking lot may be utilized for lay down area.
- D. Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

1.9 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. On-Site Work Hours:
 - 1. Limit Work outside of building to normal business working hours Monday through Friday, unless otherwise indicated.
- C. Nonsmoking Building: Smoking is not permitted on Project site.
- D. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

1.10 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 1 General Requirements: Requirements of Sections in Division 1 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One (1) or more of the following are used on Drawings to identify materials and products:
 - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 - 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
 - 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PRE-CONSTRUCTION MEETING

- A. A Pre-Construction Meeting will be held at a time and place designated by the Architect, for the purpose of identifying responsibilities of the Owner's and the Architect's personnel and explanation of administrative procedures.
- B. The Contractor shall also use this meeting for the following minimum agenda:
 - 1. Construction Schedule.
 - 2. Use of areas of the site.
 - 3. Delivery and storage.
 - 4. Safety.
 - 5. Security.
 - 6. Cleaning up.
 - 7. Subcontractor procedures relating to:
 - a. Submittals.
 - b. Change Orders.
 - c. Applications for Payment.
 - d. Record Documents.
- C. Attendees shall include:
 - 1. The Owner.
 - 2. The Architect and any consultants.

3. The Contractor and its superintendent.
4. Major subcontractors, suppliers, and fabricators.
5. Others interested in the Work.

3.2 SECURITY PROCEDURES

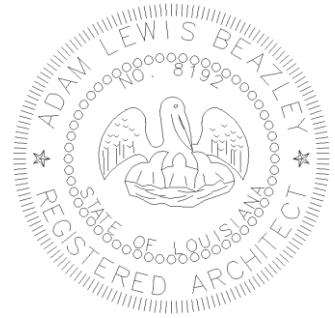
- A. Limit access to the site to persons involved in the Work.
- B. Provide secure storage for materials for which the Owner has made payment and which are stored on site.
- C. Secure completed work as required to prevent loss.
- D. Provide temporary fencing to prevent access to construction areas.

3.3 COORDINATION

- A. If necessary, inform each party involved, in writing, of procedures required for coordination; include requirements for giving notice, submitting reports, and attending meetings.
 1. Inform the Owner when coordination of his work is required.
- B. See other requirements in other portions of the Contract Documents.

END OF SECTION 01 10 00

SECTION 01 21 00 – ALLOWANCES
(BID SET REVISION 1/26/26)



PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
- B. Types of allowances include the following:
 - 1. Lump-sum allowances.
 - 2. Unit-cost allowances.
 - 3. Quantity allowances.
 - 4. Contingency allowances.
 - 5. Testing and inspecting allowances.
- C. Related Requirements:
 - 1. Section 01 40 00 "Quality Requirements" for procedures governing the use of allowances for field testing by an independent testing agency.

1.3 DEFINITIONS

- A. Allowance is a quantity of Work or dollar amount established in lieu of additional requirements, used to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

1.4 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection, or purchase and delivery, of each product or system described by an allowance must be completed by the Owner to avoid delaying the Work.
- B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Architect from the designated supplier.

1.5 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances in the form specified for Change Orders.

1.6 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.7 UNIT-COST ALLOWANCES

- A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight, and delivery to Project site.
- B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner or selected by Architect under allowance shall be included as part of the Contract Sum and not part of the allowance.
- C. Unused Materials: Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.
 - 1. If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

1.8 CONTINGENCY ALLOWANCES

- A. Use the contingency allowance only as directed by Architect for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.
- B. Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.
- C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit.
- D. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.9 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.

1. Include installation costs in purchase amount only where indicated as part of the allowance.
 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other markups.
 3. Submit substantiation of a change in scope of Work, if any, claimed in Change Orders related to unit-cost allowances.
 4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.
- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.
1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of Work has changed from what could have been foreseen from information in the Contract Documents.
 2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

- A. **Design Contingency Allowance:** Include the sum of 1% (of base bid) Design Contingency allowance.

END OF SECTION 01 21 00

SECTION 01 23 00 – ALTERNATES
(BID SET REVISION 1/26/26)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

- A. Alternate: An amount proposed by Bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 - 2. The cost for each alternate is the net addition to the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.
 - 3. Only add alternates will be included.
 - 4. Alternates are listed in order of priority and will be accepted in numerical order.

1.4 PROCEDURES

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- C. Execute accepted alternates under the same conditions as other Work of the Contract.
- D. Schedule: A Schedule of Alternates is included at the end of this Section. Specification sections referenced in the schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 BASE BID

- A. Base Bid: Includes all work indicated on the Contract Documents to Construct a new Building and Sitework.

3.2 SCHEDULE OF ALTERNATES

ALTERNATE NO 1: Interior Buildout of Phase 2 Portion of Main Building

Base Bid: Includes all work indicated on the Contract Documents to Construct a new Building and Sitework.

Alternate: Alternate No. 1 includes the complete interior buildout of the Phase 2 area of the main building, providing a fully functional and occupiable space per the design intent upon completion.

Architectural scope encompasses gypsum board finish on the Phase 2 side of demising walls separating Phase 1 and Phase 2, construction of all interior partitions, installation of interior storefront systems, application of all specified interior finishes, and provision of millwork.

Mechanical scope includes supply and installation of AHU-6 with associated ductwork and distribution to fully condition the Phase 2 space, wall-mounted return and supply air devices, exhaust fans as indicated, completion of plumbing rough-in and connections, supply and installation of all plumbing fixtures, and provision of the mop sink.

Electrical scope comprises finish electrical work including complete lighting, switches, and data points throughout the Phase 2 area, plus all necessary electrical connections and power for AHU-6. All MEP systems shall include fully functional connections to fixtures and equipment serving the Phase 2 area. At the completion of Alternate No. 1, the Phase 2 portion of the building shall be fully finished, operational, and ready for immediate use by the Owner in accordance with the contract documents.

ALTERNATE NO 2: Replace existing lightweight concrete deck and formboard with new B-deck, insulation and TPO roofing.

Base Bid: Demolish existing roofing down to light weight concrete decking and provide new roof insulation, and TPO roofing. Demolish any damaged existing roof decking and replace with new specified B-deck as required.

Alternate: Alternate No. 2 includes the complete demolition of existing lightweight concrete roof deck and formboard and replacement with new B-deck across the entire roof per deck schedule on structural drawings.

END OF SECTION 01 23 00



SECTION 01 25 00 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Section 01 31 23 "Project Website" for requirements for managing and submitting Project communication and documentation online using Architect's online project management website.
 - 2. Section 01 60 00 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit three (3) copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use CSI Form 13.1A.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
 - b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.

- c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - i. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - j. Cost information, including a proposal of change, if any, in the Contract Sum.
 - k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven (7) days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within fifteen (15) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than fifteen (15) days prior to time required for preparation and review of related submittals.
 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - d. Requested substitution is compatible with other portions of the Work.
 - e. Requested substitution has been coordinated with other portions of the Work.
 - f. Requested substitution provides specified warranty.
 - g. If requested substitution involves more than one (1) Contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all Contractors involved.
- B. Substitutions for Convenience: Architect will consider requests for substitution if received within ninety (90) days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.
 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - b. Requested substitution does not require extensive revisions to the Contract Documents.
 - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - d. Substitution request is fully documented and properly submitted.
 - e. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - f. Requested substitution is compatible with other portions of the Work.
 - g. Requested substitution has been coordinated with other portions of the Work.
 - h. Requested substitution provides specified warranty.
 - i. If requested substitution involves more than one (1) Contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all Contractors involved.

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 25 00

SECTION 01 25 13 - PRODUCT SUBSTITUTION REQUEST FORM

THE PROJECT AND THE PARTIES

1.1 TO: _____

1.2 PROJECT: _____

1.3 SPECIFIED ITEM:

- A. Section: _____
- B. Page: _____
- C. Paragraph: _____
- D. Description: _____

1.4 PROPOSED SUBSTITUTION

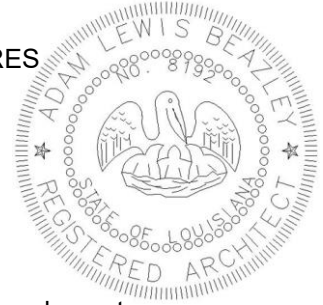
- A. The undersigned request consideration of the following:
 - 1. _____
- B. Attached data includes product description, specifications, Drawings, performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.
- C. Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.
- D. The undersigned certifies that the following paragraphs, unless modified by attachments, are correct:
 - 1. The proposed substitution does not affect dimensions shown on Drawings.
 - 2. The undersigned will pay for changes to the building design, including engineering design, detailing, and construction costs caused by the requested substitution.
 - 3. The proposed substitution will have no adverse effect on other trades, the Construction Schedule, or specified warranty requirements.
 - 4. Maintenance and service parts will be locally available for the proposed substitution.
- E. The undersigned further states that the function, appearance and quality of the proposed substitution are equivalent or superior to the specified item.

1.5 SUBMITTED BY:

- A. Signature: _____
- B. Firm: _____
- C. Date: _____
- D. Email: _____
- E. Attachments: _____

END OF FORM 01 25 13

SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES



PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
 - 1. Section 01 31 23 "Project Website" for requirements for managing and submitting Project communication and documentation online using Architect's online project management website.

1.3 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions (ASI) authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time on AIA Document G710, "Architect's Supplemental Instructions."

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests (PR): Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within twenty (20) days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - e. Quotation Form: Use forms acceptable to Architect.

- f. Upload form and all related information to Architect's online project management website as outlined in 01 31 23 "Project Website".
- B. Contractor-Initiated Change Order Proposals (COP): If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.
 - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 4. Include costs of labor and supervision directly attributable to the change.
 - 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - 6. Comply with requirements in Section 01 25 00 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
 - 7. Proposal Request Form: Use form acceptable to Architect.
 - 8. Upload form and all related information to Architect's online project management website.

1.5 ADMINISTRATIVE CHANGE ORDERS

- A. Unit-Price Adjustment: If Unit-Prices are specified for parts of the Work, refer to Section 01 22 00 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.6 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Changes Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

1.7 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive (CCD): Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 26 00

SECTION 01 29 00 - PAYMENT PROCEDURES



PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
 - 1. Section 01 26 00 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 2. Section 01 32 00 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's Construction Schedule.

1.3 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule. Cost-loaded Critical Path Method Schedule may serve to satisfy requirements for the Schedule of Values.
 - 1. Coordinate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with Continuation Sheets.
 - b. Submittal Schedule.
 - c. Items required to be indicated as separate activities in Contractor's Construction Schedule.
 - 2. Submit the Schedule of Values to Architect at earliest possible date, but no later than seven (7) days before the date scheduled for submittal of initial Applications for Payment.
 - 3. Sub-Schedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide sub-schedules showing values coordinated with each phase of payment.
 - 4. Sub-schedules for Separate Elements of Work: Where the Contractor's Construction Schedule defines separate elements of the Work, provide sub-schedules showing values coordinated with each element.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one (1) line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the Schedule of Values:

- a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
2. Arrange Schedule of Values consistent with format of AIA Document G703.
3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of 5 percent of the Contract Sum.
4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Allowances: Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
8. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown as separate line items in the Schedule of Values as general conditions expenses.
9. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.4 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
- D. Application for Payment Forms: Use forms provided by Owner for Applications for Payment. Sample copies are included in Project Manual.

- E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 - 1. Entries shall match data on the Schedule of Values and Contractor's construction schedule. Use updated schedules if revisions were made.
 - 2. Include amounts for Work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 - 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 - 4. Indicate separate amounts for work being carried out under Owner-requested Project acceleration.

- F. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
 - 1. Provide Certificate of Insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
 - 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 - 3. Provide summary documentation for stored materials indicating the following:
 - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
 - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
 - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.

- G. Transmittal: Submit four (4) signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt. One (1) copy shall include waivers of lien and similar attachments if required.
 - 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

- H. Waivers of Mechanic's Lien: If requested by the, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous applications for payment.
 - 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 - 2. When an application shows completion of an item, submit conditional final or full waivers.
 - 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 - 4. Waiver Forms: Submit executed waivers of lien on forms, acceptable to Owner.

- I. Final Waivers of Mechanic's Lien: With the Application for Payment immediately following the expiration of the lien period prescribed by law, submit complete waivers of mechanic's lien from every entity lawfully entitled to file a mechanic's lien or other lien arising out of the Contract and related to the Work or a Lien and Privilege Certificate (Lien-Free Certificate) issued by the Clerk of Court of the Parish in which the Contract was recorded.

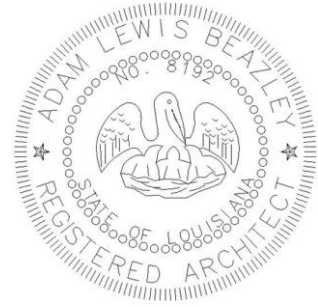
- J. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of Values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Products list (preliminary if not final).
 5. Schedule of unit prices.
 6. Submittal schedule (preliminary if not final).
 7. List of Contractor's staff assignments.
 8. List of Contractor's principal consultants.
 9. Copies of building permits.
 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 11. Initial Progress Report.
 12. Report of Preconstruction Conference.
 13. Certificates of insurance and insurance policies.
 14. Performance and payment bonds.
- K. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- L. Application for Payment of Retainage: The Contractor may make one (1) Application for Payment between Substantial Completion and the Final Application for Payment.
1. Upon expiration of the lien period prescribed by law and submission of a "Lien and Privilege Certificate described above, the Contractor may submit an Application for Payment requesting payment of retainage.
 2. Payment for sums withheld to complete the Work or held to complete items in the "Punchlist" will not be made until the Final Application for Payment and all items of Work have been satisfactorily completed.
- M. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 6. AIA Document G707, "Consent of Surety to Final Payment."
 7. Evidence that claims have been settled.
 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 29 00

SECTION 01 31 00 - PROJECT MANAGEMENT
AND COORDINATION



PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Coordination drawings.
 - 3. Requests for Information (RFI's).
 - 4. Project meetings.
- B. Related Requirements:
 - 1. Section 01 31 23 "Project Website" for requirements for managing and submitting Project communication and documentation online using Architect's online project management website.
 - 2. Section 01 32 00 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
 - 3. Section 01 73 00 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 4. Section 01 77 00 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

- A. RFI: Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Use CSI Form 1.5A. or other similar form approved by the Architect. Include the following information in tabular form:
 - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 - 2. Scope of work covered by the subcontract or products or equipment being provided by the supplier.

- B. Key Personnel Names: Within fifteen (15) days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

- 1. Post copies of list in Project Meeting Room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.5 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.

- 1. Schedule construction operations in sequence required to obtain the best results where installation of one (1) part of the Work depends on installation of other components, before or after its own installation.
- 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair. Failure to properly coordinate the installation of multiple components shall be considered cause for rejection of installed work requiring the Contractor to remove and reinstall work in a properly coordinated manner.
- 3. Make adequate provisions to accommodate items scheduled for later installation.
- 4. For work conducted by public or private utilities required as part of the Work of this Contract, the Contractor shall coordinate and pay for the Work. The Owner will make arrangements to allow the Contractor access to account information as necessary to complete the Work at the request of the Contractor.

- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

- 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of Owners separate contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

- 1. Preparation of Contractor's Construction Schedule.
- 2. Preparation of the Schedule of Values.
- 3. Installation and removal of temporary facilities and controls.
- 4. Delivery and processing of submittals.
- 5. Progress meetings.
- 6. Preinstallation conferences.
- 7. Project closeout activities.
- 8. Startup and adjustment of systems.

1.6 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
 - b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
 - c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - f. Indicate required installation sequences.
 - g. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawing Organization: Organize coordination drawings as follows:
1. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
 2. Mechanical and Plumbing Work: Show the following:
 - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
 - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
 - c. Fire-rated enclosures around ductwork.
 3. Electrical Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1-1/4 inches (32 mm) in diameter and larger.
 - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
 - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
 - d. Location of pull boxes and junction boxes, dimensioned from column center lines.

4. Fire-Protection System: Show the following:
 - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
 5. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make changes as directed and resubmit.
 6. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 01 33 00 "Submittal Procedures."
- C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
 2. File Preparation Format: DXF, Version 2014, operating in Microsoft Windows operating system.
 3. File Submittal Format: Submit or post coordination drawing files using format same as file preparation format.
 4. Architect will furnish Contractor digital data files of Drawings for use in preparing coordination digital data files upon request and in compliance with the conditions set below.
 - a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
 - b. Data contained in these electronic files are part of the Architect's instruments of service and are subject to copyright protection. Use of the data contained in the files by the Contractor or anyone else receiving this data through or from the Contractor for any purpose other than as a source of information for this Project and shall be strictly prohibited.
 - c. Contractor shall execute a data licensing agreement in the form of Agreement included in this Project Manual: 01 33 00 - Agreement for Single Use of Electronic (CAD) Media.

1.7 REQUESTS FOR INFORMATION (RFI's)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
 1. Architect will return RFI's submitted to Architect by other entities controlled by Contractor with no response.
 2. Coordinate and submit RFI's in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
 3. Submit RFI using the Architect's online project management website.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
 1. RFI number, numbered sequentially and coordinated with Contractor's own software if used in conjunction with Architect's online project management resource.
 2. RFI subject.

3. Specification Section number and title and related paragraphs, as appropriate.
 4. Drawing number and detail references, as appropriate.
 5. Field dimensions and conditions, as appropriate.
 6. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 7. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: Software-generated form with substantially the same content as indicated above, is not acceptable to Architect.
1. Information in form shall be transcribed into Architect's online project management website.
 2. Attachments shall be electronic files in Adobe Acrobat PDF format.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFI's received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following Contractor-generated RFI's will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFI's or inaccurately prepared RFI's.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
 3. Architect's action on RFI's that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 01 26 00 "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within ten (10) days of receipt of the RFI response.
- E. RFI Log: RFI log shall be available on Architect's online project management website.
- F. On receipt of Architect's action, immediately distribute the RFI response to affected parties. Review response and notify Architect within seven (7) days if Contractor disagrees with response.
1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

1.8 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
 - 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
 - 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 - 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three (3) days of the meeting.

- B. Preconstruction Conference: Architect will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than fifteen (15) days after execution of the Agreement.
 - 1. Conduct the conference to review responsibilities and personnel assignments.
 - 2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 3. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing and long-lead items.
 - d. Designation of key personnel and their duties.
 - e. Lines of communications.
 - f. Procedures for setup and use of online project management website.
 - g. Procedures for processing field decisions and Change Orders.
 - h. Procedures for RFI's.
 - i. Procedures for testing and inspecting.
 - j. Procedures for processing Applications for Payment.
 - k. Distribution of the Contract Documents.
 - l. Submittal procedures.
 - m. Preparation of record documents.
 - n. Work restrictions.
 - o. Working hours.
 - p. Owner's occupancy requirements.
 - q. Responsibility for temporary facilities and controls.
 - r. Procedures for disruptions and shutdowns.
 - s. Construction waste management and recycling.
 - t. Parking availability.
 - u. Progress cleaning.
 - 4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
 - 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and

- installations that have preceded or will follow, shall attend the meeting. Advise Architect, and Owner's Commissioning Authority of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related RFI's.
 - d. Related Change Orders.
 - e. Submittals.
 - f. Review of mockups.
 - g. Possible conflicts.
 - h. Compatibility requirements.
 - i. Time schedules.
 - j. Manufacturer's written instructions.
 - k. Coordination with other work.
 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Project Closeout Conference: Schedule and conduct a Project Closeout Conference, at a time convenient to Owner and Architect, but no later than sixty (60) days prior to the scheduled date of Substantial Completion.
1. Conduct the conference to review requirements and responsibilities related to Project closeout.
 2. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
 - a. Preparation of Record Documents.
 - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
 - c. Submittal of written warranties.
 - d. Requirements for preparing operations and maintenance data.
 - e. Requirements for delivery of material samples, attic stock, and spare parts.
 - f. Requirements for demonstration and training.
 - g. Preparation of Contractor's punch list.
 - h. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
 - i. Submittal procedures.
 - j. Owner's partial occupancy requirements.
 - k. Installation of Owner's furniture, fixtures, and equipment.
 - l. Responsibility for removing temporary facilities and controls.
 4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

E. Progress Meetings: Conduct progress meetings at monthly intervals.

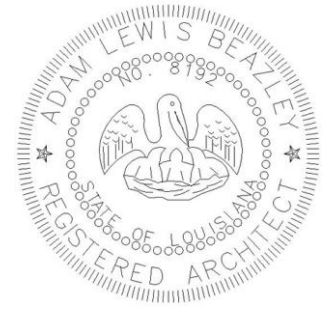
1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner, Owner's Commissioning Authority and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Sequence of operations.
 - 2) Status of submittals.
 - 3) Site utilization.
 - 4) Temporary facilities and controls.
 - 5) Progress cleaning.
 - 6) Quality and work standards.
 - 7) Status of correction of deficient items.
 - 8) Field observations.
 - 9) Status of RFI's.
 - 10) Status of proposal requests.
 - 11) Pending changes.
 - 12) Status of Change Orders.
 - 13) Pending claims and disputes.
 - 14) Documentation of information for payment requests.
4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
 - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 31 00

SECTION 01 31 23 – PROJECT WEB SITE



PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative provisions for hosting and managing Project communication and documentation (unless specified otherwise) through Final Completion.
- B. Platform: A Beazley Architecture's online project management system, "CENTERLINE PIM" (<https://www.centerline.co>), is a web-based platform for Project Information Management which includes, but is not limited to the following:
 - 1. Project directory.
 - 2. Project correspondence.
 - 3. Meeting minutes.
 - 4. Field Reports.
 - 5. Contract modifications (Change Order Request, Architect's Supplemental Instructions).
 - 6. Payment Applications
 - 7. RFI logs.
 - 8. Task and issue management.
 - 9. Submittals and shop drawings with logs.
 - 10. Drawing and specification document hosting, viewing and updating.
 - 11. Reminder and tracking functions.
 - 12. Schedules.
 - 13. Contractor daily logs.
 - 14. Closeout Document hosting
- C. Related Sections include the following:
 - 1. Section 01 25 00 "Substitution Procedures" for preparing and submitting requests for substitutions.
 - 2. Section 01 26 00 "Contract Modification Procedures" for handling and processing Contract modifications.
 - 3. Section 01 31 00 "Project Management and Coordination" for coordinating construction operations on Project.
 - 4. Section 01 32 00 "Construction Progress Documentation" for preparing and submitting Contractor's Construction Schedule.
 - 5. Section 01 33 00 "Submittal Procedures" for preparing and submitting submittals.

1.2 USER ACCESS

- A. General: Utilize A Beazley Architecture's online project management system, "CENTERLINE PIM", for electronic submittal of all data and documents throughout the duration of the construction Contract. The joint use of this system is to facilitate electronic exchange of information, automation of key processes and overall management of the construction Contract. Use "CENTERLINE PIM" as the primary means of Project information submission and management. When required by the Owner and/or Architect, also provide paper documents. In the event of discrepancy between the electronic version and paper documents, the paper documents will govern.

- B. The Architect will control the Contractor's access to "CENTERLINE PIM" by allowing access and assigning user profiles to accepted Contractor personnel. User profiles will define levels of access into the system, determine assigned function-based authorizations (determines what information can be seen) and user privileges (determines what they can do). Subcontractors and suppliers MAY be given permission to access the "CENTERLINE PIM" website, but in such circumstances all final submittals and RFIs should come directly from the Contractor.

1.3 RESPONSIBILITIES OF CONTRACTOR

- A. Be responsible for opening the invitation email and accepting the invitation by clicking on the link inside. Then accurately and completely filling out all personal and business information in the online forms provided and creating and maintaining user login information necessary to regularly access the website.
- B. Be responsible for maintaining copies of electronic data throughout the duration of the construction Contract. The "CENTERLINE PIM" website is not intended to serve as a hosted data server for the Contractor.
- C. Be responsible for the validity of the information placed on the "CENTERLINE PIM" website and for the abilities of personnel using the website. Users Qualifications: Knowledgeable in the use of computer, including internet browsers, email programs, CAD drawing applications and Adobe Portable Document Format (PDF) document distribution program.
- D. Provide a list of key personnel email addresses to be provided with user profiles on the "CENTERLINE PIM" website.
- E. Transmittal forms are NOT generated by the "CENTERLINE PIM" software. The Contractor may include additional forms of their own as attachments, however, information will not be duplicated by the Architect onto the Contractor's forms. Refer to Sections 01 31 00 and 01 33 00 for additional procedures related to RFI's and submittals.

1.4 COMPUTER REQUIREMENTS

- A. "CENTERLINE PIM" is a web-based environment and therefore subject to the inherent speed and connectivity problems of the Internet. The Contractor is responsible for its own connectivity to the internet. "CENTERLINE PIM" response time is dependent on the Contractor's equipment, including processor speed, internet access speed, etc. and current traffic on the internet. The Architect will not be liable for any delays associated from the usage of "CENTERLINE PIM" system (whether at the Contractor's office or the job site) is accomplished through DSL, cable, T-1 or wireless communication systems. Under no circumstances shall the usage of the "CENTERLINE PIM" website be grounds for extensions to the Contract time or to the Contract sum.

1.5 INFORMATION EXCHANGE NAVIGATION

- A. General: Access to the "CENTERLINE PIM" website is available from A Beazley Architecture's website (<http://abeazleyarchitecture.com>) by clicking the building icon at the bottom right side of the website footer, or by going to the following web address <https://www.centerline.co>. Users will be added by the Architect, and an invitation email will be sent with a signup link. Upon signup, all users will be able to create their own login password.

- B. Online Resources: Refer to the “Help” menu on the “CENTERLINE PIM” website for step-by-step procedures and answers to common questions. For additional assistance, contact A Beazley Architecture’s system administrator.

- C. “CENTERLINE PIM” users can create, view and/or send the following items depending on level of access given by Administrator:
 - 1. Calendar.
 - 2. Notifications.
 - 3. Correspondence Log.
 - 4. File Manager (Depending on project/access)
 - 5. Task & Share Manager (Depending on project/access)
 - 6. Design Package Review (Depending on project/access)
 - 7. Drawings.
 - 8. Specifications.
 - 9. Architects Supplemental Instructions (ASI’s) Documents.
 - 10. Submittals.
 - 11. Requests for Information (RFI).
 - 12. Change Orders.
 - 13. Construction Change Directives.
 - 14. Request for Change.
 - 15. Work Change Proposal Request.
 - 16. Payment Applications.
 - 17. Photos.
 - 18. Field Reports.
 - 19. Meeting Minutes.
 - 20. Contractor Daily Logs.
 - 21. Miscellaneous Documents.
 - 22. Schedules.
 - 23. Testing Reports.
 - 24. Punch List.
 - 25. As-Built Drawings.
 - 26. Closeout Submittals.
 - 27. O&M Data.
 - 28. Warranty Items.
 - 29. Clear L&P.
 - 30. Substantial Completion Certificate.

PART 2 - PRODUCTS

2.1 A BEAZLEY ARCHITECTURE

- A. A Beazley Architecture’s “CENTERLINE PIM” Online Project Information Management Website (no equal) provided by CENTERLINE PIM LLC. <http://www.centerline.co>

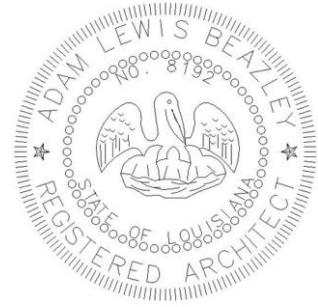
PART 3 - EXECUTION

3.1 UTILIZATION

- A. Include the use of Online Project Management Website on the agenda for the Preconstruction Conference as indicated in Section 01 31 00.
- B. Utilize the "CENTERLINE PIM" website for submittal preparation and information management as required by this Section.
- C. Carbon Copy the CENTERLINE PIM project email (customized for each project), on all correspondence transmitted via email to ensure proper tracking in "CENTERLINE PIM" correspondence log.

END OF SECTION 01 31 23

SECTION 01 32 00 - CONSTRUCTION PROGRESS
DOCUMENTATION



PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's Construction Schedule.
 - 2. Construction schedule updating reports.
 - 3. Daily construction reports.
 - 4. Material location reports.
 - 5. Site condition reports.
 - 6. Special reports.
- B. Related Requirements:
 - 1. Section 01 31 23 "Project Website" for requirements for managing and submitting Project communication and documentation online using Architect's online project management website.
 - 2. Section 01 33 00 "Submittal Procedures" for submitting schedules and reports.
 - 3. Section 01 40 00 "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
 - 1. PDF electronic file.
 - 2. Two (2) paper copies along with physical samples.
- B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
- C. Construction Schedule Updating Reports: Submit with Applications for Payment.
- D. Daily Construction Reports: Submit at weekly intervals.
- E. Material Location Reports: Submit at monthly intervals.
- F. Site Condition Reports: Submit at time of discovery of differing conditions.

- G. Special Reports: Submit at time of unusual event.

1.4 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's construction schedule with the Schedule of Values, submittal schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from entities involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Final Completion.
 - 1. Contract Completion Date shall not be changed by submission of a schedule that shows an early Completion Date, unless specifically authorized by Change Order.
- B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
 - 1. Activity Duration: Define activities so no activity is longer than twenty (20) days, unless specifically allowed by Architect.
 - 2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than sixty (60) days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 - 3. Submittal Review Time: Include review and re-submittal times indicated in Section 01 33 00 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
 - 4. Startup and Testing Time: Include no fewer than fifteen (15) days for startup and testing.
 - 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
 - 6. Punch List and Final Completion: Include not more than forty-five (45) days for completion of punch list items and final completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule and show how the sequence of the Work is affected.
 - 1. Phasing: Arrange list of activities on schedule by phase.
 - 2. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.

3. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 01 10 00 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 4. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Use of premises restrictions.
 - d. Environmental control.
 5. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
 - a. Periods when access will be limited by construction activities.
 - b. Partial occupancy or Substantial Completion
 - c. Substantial Completion.
 6. Other Constraints: Special events or services that require special consideration or preparation.
- D. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.
1. See Section 01 29 00 "Payment Procedures" for cost reporting and payment procedures.
- E. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
1. Unresolved issues.
 2. Unanswered Requests for Information.
 3. Rejected or unreturned submittals.
 4. Notations on returned submittals.
 5. Pending modifications affecting the Work and Contract Time.
- F. Recovery Schedule: When periodic update indicates the Work is fourteen (14) or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's construction schedule within thirty (30) days of date established for the Notice to Proceed. Base schedule on the startup construction schedule and additional information received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
 1. For construction activities that require three (3) months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

2.3 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
 2. List of separate contractors at Project site.
 3. Approximate count of personnel at Project site.
 4. Equipment at Project site.
 5. Material deliveries.
 6. High and low temperatures and general weather conditions, including presence of rain or snow.
 7. Accidents.
 8. Meetings and significant decisions.
 9. Unusual events (see special reports).
 10. Stoppages, delays, shortages, and losses.
 11. Services connected and disconnected.
 12. Equipment or system tests and startups.
- B. Material Location Reports: At monthly intervals corresponding with the Application for Payment, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:
1. Material stored prior to previous report and remaining in storage.
 2. Material stored prior to previous report and since removed from storage and installed.
 3. Material stored following previous report and remaining in storage.
- C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.4 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner and Architect within one (1) day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner and Architect in advance when these events are known or predictable.

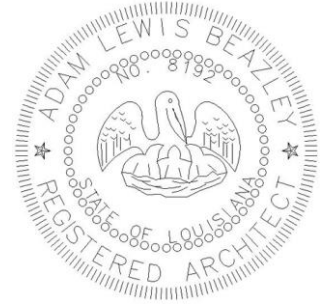
PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one (1) week before each regularly scheduled progress meeting.
 - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 - 3. As the Work progresses, indicate final completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
 - 1. Post copies in Project meeting rooms and temporary field offices.
 - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 01 32 00

SECTION 01 33 00 - SUBMITTAL PROCEDURES



PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. The Architect's review of submittals is defined in the General and Supplementary Conditions of the Contract and is for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents and does not relieve the Contractor from compliance with the requirements of the Contract Documents. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, all of which remain the responsibility of the Contractor.
- C. Related Requirements:
 - 1. Section 01 29 00 "Payment Procedures" for submitting Applications for Payment and the Schedule of Values.
 - 2. Section 01 25 00 "Substitution Procedures" for submitting products or materials for substitution.
 - 3. Section 01 31 00 "Project Management and Coordination" for submitting Coordination Documents and the use of the Architects digital files.
 - 4. Section 01 31 23 "Project Website" for requirements for managing and submitting Project communication and documentation online using Architect's online project management website.
 - 5. Section 01 32 00 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule.
 - 6. Section 01 78 23 "Operation and Maintenance Data" for submitting Operation and Maintenance Manuals.
 - 7. Section 01 78 39 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols.

An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

- C. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 SUBSTITUTIONS

- A. Submittal of products or materials that have not been approved for use in the Work are to be submitted under Section 01 25 00 "Substitution Procedures" and will not be reviewed as submittals.

1.5 ACTION SUBMITTALS

- A. Submittal Schedule: Submit a Schedule of Submittals, arranged in chronological order by dates required by Construction Schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
 - 1. Coordinate Submittal Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
 - 2. Initial Submittal: Submit concurrently with Startup Construction Schedule. Include submittals required during the first sixty (60) days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 - 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.
 - a. Submit revised Submittal Schedule to reflect changes in current status and timing for submittals.
 - 4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification section number and title.
 - c. Submittal category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Architect's final release or approval.
 - g. Scheduled date of fabrication.
 - h. Scheduled dates for purchasing.
 - i. Scheduled dates for installation.
 - j. Activity or event number.

1.6 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Architect will furnish Contractor digital data files of Drawings for use in preparing Shop Drawings and Project Record Drawings upon request and in compliance with the conditions set below.

1. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
 2. Data contained in these electronic files are part of the Architect's instruments of service and are subject to copyright protection. Use of the data contained in the files by the Contractor or anyone else receiving this data through or from the Contractor for any purpose other than as a source of information for this Project and shall be strictly prohibited.
 3. Contractor shall execute a data licensing agreement in the form of Agreement included in this Project Manual: 01 33 01 - Agreement for Single Use of Electronic (CAD) Media.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved Submittal Schedule.
 - a. Where items specified in a specification section are provided by different suppliers, submittals may be separate submittals reflecting the division of responsibility.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for re-submittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including re-submittals.
1. Initial Review: Allow fifteen (15) days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Re-submittal Review: Allow fifteen (15) days for review of each re-submittal.
 4. Sequential Review: Where sequential review of submittals by Architect, Architect's consultants, Owner, or other parties is indicated, allow twenty-one (21) days for initial review of each submittal.
- D. Paper Submittals for physical samples: Place a permanent label or title block on each submittal item for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
 3. Include the following information for processing and recording action taken:
 - a. Project name.
 - b. Date.

- c. Name of Architect.
 - d. Name of Contractor.
 - e. Name of subcontractor.
 - f. Name of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.
 - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential letter and number (e.g., 06 10 00. A1 for the first submittal). Different materials in the same section will have different letter designations (06 10 00.A1, 06 10 00.B1). Re-submittals shall add to the number (e.g., 06 10 00.A2, 06 10 00.B2 as the second submittal of the "A" or "B" material).
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Location(s) where product is to be installed, as appropriate.
 - l. Other necessary identification.
4. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
- a. Submit one (1) copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
5. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return without review submittals received from sources other than Contractor.
- a. Transmittal Form for Paper Submittals: Use AIA Document G810 or other submittal form acceptable to the Architect.
- E. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
- 1. Assemble complete submittal package into a single file incorporating submittal requirements and transmittal form.
 - 2. Name file with submittal number or other unique identifier, including revision identifier.
 - a. File name shall use Project identifier and submittal number as described above (e.g., LNHS-06 10 00.A1).
 - 3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
 - 4. Transmittal Form for Electronic Submittals: Use electronic form containing information required for paper submittals described above.
 - a. Materials to be used for color selection may not be submitted electronically.
- F. Options: Identify options requiring selection by Architect.
- G. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract

Documents, including minor variations and limitations. Include same identification information as related submittal.

- H. Re-submittals: Make re-submittals in same form and number of copies as initial submittal.
 - 1. Note date and content of previous submittal.
 - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 - 3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.
- I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- J. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
 - 1. Submit electronic copies of all submittals as PDF electronic files using Architect's online project management resource website as outlined in 01 31 23 Project Website. Paper copies may be required in addition to electronic submittals as required in individual sections.
 - a. Architect will upload annotated file to Architect's online project management website and inform Contractor.
 - 2. Action Submittals: Submit one (1) electronic copy. Provide two (2) paper copies when required by individual sections.
 - a. Architect will upload annotated file to Architect's online project management website and inform Contractor.
 - 3. Informational Submittals: Submit one (1) electronic copy.
 - a. Architect will review and annotate file on Architect's online project management website and inform Contractor.
 - 4. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 - a. Provide a notarized statement on original paper copy certificates and certifications where indicated.

- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which specific products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards or highlight applicable standards in manufacturer's standard product cut sheets.
 - e. Testing by recognized testing agency.
 - f. Notation of coordination requirements.
 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 5. Submit Product Data before or concurrent with Samples.
 6. Submit Product Data in the following format:
 - a. PDF electronic file.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm), but no larger than 30 by 42 inches.
 3. Submit Shop Drawings in the following format:
 - a. PDF electronic file.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one (1) submittal package.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of applicable Specification Section.
 - e. Specification paragraph number and generic name of each item.
 3. In addition to the physical samples and paper copies of the transmittal, provide electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
 4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
 5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit three (3) full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return two (2) of the submittal copies with options selected for the Contractor and manufacturer.
 6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three (3) sets of Samples. Architect will retain one (1) Sample set; remainder will be returned. Mark up and retain one (1) returned Sample set as a Project record sample.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three (3) sets of paired units that show approximate limits of variations.
- E. Coordination Drawing Submittals: Comply with requirements specified in Section 01 31 00 "Project Management and Coordination."

- F. Contractor's Construction Schedule: Comply with requirements specified in Section 01 32 00 "Construction Progress Documentation."
- G. Application for Payment and Schedule of Values: Comply with requirements specified in Section 01 29 00 "Payment Procedures."
- H. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 01 40 00 "Quality Requirements."
- I. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 01 77 00 "Closeout Procedures."
- J. Maintenance Data: Comply with requirements specified in Section 01 78 23 "Operation and Maintenance Data."
- K. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- L. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- M. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- N. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- O. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- P. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- Q. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- R. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- S. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- T. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

- U. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- V. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

2.2 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
 - 1. Submittals that have not been reviewed and approved by the Contractor prior to submittal to the Architect will be returned with out action by the Architect.
- B. Project Closeout and Maintenance Material Submittals: See requirements in Section 01 78 23 "Operation and Maintenance Data".
- C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

- A. Action Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will indicate action on the transmittal or stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.

1. Not Reviewed: The submittal is not required to be reviewed by the Contract, no further action is necessary.
 2. Reviewed: No exceptions have been taken and the Contractor may proceed.
 3. Exceptions Noted: The Contractor shall make the corrections noted and may proceed without resubmitting the submittal.
 4. Revise and Resubmit: The Contractor shall make necessary corrections and resubmit the submittal for approval. The Contractor is not authorized to proceed.
 5. Rejected: The Contractor shall provide a new submittal which meets the requirements of the contract for approval. The Contractor is not authorized to proceed.
- B. Informational Submittals: Architect will review each submittal and will not return it or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for re-submittal without review.
- E. Submittals not required by the Contract Documents may be returned by the Architect without action.

END OF SECTION 01 33 00

01 33 01 - AGREEMENT FOR USE OF ELECTRONIC (CAD) MEDIA

PROJECT NUMBER
2025-006

PROJECT NAME
HARVEST CENTER CHURCH

In accordance with the Contractor's request, and at a cost of \$100.00 per sheet, to facilitate the preparation of coordination drawings, shop drawings or submittals, A Beazley Architecture and its consultants will provide electronic read-only-files for the contractor's singular, limited use specifically for this project and subject to the following terms and conditions:

1. The electronic files were produced using AutoCAD. A Beazley Architecture makes no representation as to the compatibility of these files with Contractor's hardware or software.
2. The electronic files remain the property of A Beazley Architecture and in no case shall the transfer of these files be considered a sale of the files to the Contractor.
3. The Contractor is strictly prohibited from the transfer of these files to any other party.
4. Data contained in these electronic files are part of A Beazley Architecture's instruments of service and are subject to copyright protection. Use of the data contained in the files by the contractor or anyone else receiving this data through or from the Contractor for any purpose other than as a source of information for this Project and shall be strictly prohibited.
5. Data contained in these electronic files shall not be relied upon as an authoritative source of data for design or layout. Any use by the Contractor or by others shall be at the Contractor's sole risk and without liability or legal exposure to A Beazley Architecture. The party receiving electronic files 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 ABM, its officers, directors, employees, agents or sub-consultants that may arise out of or in connection with their use of these electronic files.
6. Furthermore, the Contractor shall, to the fullest extent permitted by law, indemnify and hold harmless A Beazley Architecture from all claims, damages, losses and expenses, including attorney's fees arising out of or resulting from the contractor's use of these electronic files.

AUTHORIZED ACCEPTANCE:

CONTRACTOR'S NAME:

SUB-CONTRACTOR'S NAME

AUTHORIZED SIGNATORY:

AUTHORIZED SIGNATORY:

TITLE:

TITLE:

SIGNATURE:

SIGNATURE:

DATE:

DATE:

ELECTRONIC FILES REQUESTED

01 33 02 - AGREEMENT FOR SINGLE USE OF ELECTRONIC (BIM) REVIT MEDIA

PROJECT NUMBER

2025-006

PROJECT NAME

HARVEST CENTER CHURCH

In accordance with the Contractor's request, and at a cost of \$500.00, to facilitate the preparation of the Building Information Model ("BIM") file for transmittal, A Beazley Architecture and its consultants will provide electronic BIM files for the Contractor's, limited use specifically for this project and subject to the following terms and conditions:

1. The electronic BIM files were produced using Revit and saved/exported as a .RVT and/or .IFC file. BIM files, like any electronic data, transferred in any manner or translated from the system and format used by all of the design professionals on this Project to another system or format are subject to errors and modifications that may affect the accuracy and reliability of the data, and, in addition, that electronic data may be altered or corrupted whether inadvertently or otherwise. As a result, A Beazley Architecture makes no representations or warranties, whether expressed or implied, as to the accuracy of the BIM files transferred herein.
2. The electronic BIM files remain the property of A Beazley Architecture and in no case shall the transfer of these files be considered a sale of the files to the Contractor.
3. The contractor is strictly prohibited from the transfer of these files to any other party.
4. Data contained in these electronic BIM files are part of A Beazley Architecture's instruments of service and are subject to copyright protection. Use of the data contained in the BIM files by the Contractor or anyone else receiving this data through or from the Contractor for any purpose other than as a source of information for this Project and shall be strictly prohibited.
5. Data contained in these electronic BIM files shall not be relied upon as an authoritative source of data for design or layout. Any use by the Contractor or by others shall be at the Contractor's sole risk and without liability or legal exposure to A Beazley Architecture. The party receiving the electronic BIM files 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 A Beazley Architecture, its officers, directors, employees, agents or sub-consultants that may arise out of or in connection with their use of these electronic BIM files.
6. Furthermore, the Contractor shall, to the fullest extent permitted by law, indemnify and hold harmless A Beazley Architecture from all claims, damages, losses and expenses, including attorney's fees arising out of or resulting from the Contractor's use of these electronic BIM files.

AUTHORIZED ACCEPTANCE:

CONTRACTOR'S NAME:

SUB-CONTRACTOR'S NAME

AUTHORIZED SIGNATORY:

AUTHORIZED SIGNATORY:

TITLE:

TITLE:

SIGNATURE:

SIGNATURE:

DATE:

DATE:

SECTION 01 40 00 - QUALITY REQUIREMENTS



PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, Commissioning Authority, or authorities having jurisdiction are not limited by provisions of this Section.

1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include Contract enforcement activities performed by Architect.
- C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
- D. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

- E. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
- F. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- H. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

1.4 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two (2) or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. Conflicts within the Contract Documents: If the Contract Documents require different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent, more costly or more restrictive requirement. Refer conflicting requirements to Architect for a decision before proceeding.
- C. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.5 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
 - 1. Project Quality-Control Manager may also serve as Project Manager for the Project.
- B. Continuous Inspection of Workmanship: Provide continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- C. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.6 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
1. Date of issue.
 2. Project title and number.
 3. Name, address, and telephone number of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and re-inspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of technical representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of factory-authorized service representative making report.
 2. Statement that equipment complies with requirements.
 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 4. Statement whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.
- D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.7 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

- B. **Manufacturer Qualifications:** A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. **Fabricator Qualifications:** A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. **Installer Qualifications:** A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. **Professional Engineer Qualifications:** A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or products that are similar in material, design, and extent to those indicated for this Project.
- F. **Specialists:** Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 - 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. **Testing Agency Qualifications:** An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
 - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. **Manufacturer's Technical Representative Qualifications:** An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. **Factory-Authorized Service Representative Qualifications:** An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. **Mockups:** Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
 - 2. Notify Architect seven (7) days in advance of dates and times when mockups will be constructed.
 - 3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.
 - 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 5. Obtain Architect's approval of mockups before starting work, fabrication, or construction.

- a. Allow seven (7) days for initial review and each re-review of each mockup.
- 6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
- 7. Demolish and remove mockups when directed unless otherwise indicated.

1.8 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 - 2. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
 - 1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 - 2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 - 3. Notify testing agencies at least twenty-four (24) hours in advance of time when Work that requires testing or inspecting will be performed.
 - 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 - 5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 - 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 01 33 00 "Submittal Procedures."
- D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- E. Retesting/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.

- F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 - 1. Access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 - 4. Facilities for storage and field curing of test samples.
 - 5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 - 6. Security and protection for samples and for testing and inspecting equipment at Project site.
- G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.9 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:
 - 1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
 - 2. Notifying Architect, Commissioning Authority, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 - 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect and Commissioning Authority with copy to Contractor and to authorities having jurisdiction.
 - 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 - 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 - 6. Retesting and re-inspecting corrected Work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
 - 1. Date test or inspection was conducted.
 - 2. Description of the Work tested or inspected.
 - 3. Date test or inspection results were transmitted to Architect.
 - 4. Identification of testing agency or special inspector conducting test or inspection.

- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's, Commissioning Authority's, reference during normal working hours.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01 73 00 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

3.3 SCHEDULE OF TESTING

- A. Provide minimum testing below unless more stringent testing is required by individual section of the specifications.
- B. Structural Concrete:
 - 1. Aggregate Test:
 - a. Check the proposed aggregate in accordance with ASTM C 33.
 - b. For concrete 6000 psi and higher, perform ASTM C 799 also.
 - 2. Mix Design: Check the proposed mixes for proportions, water cement ratio and slump in accordance with ACI 613 and 318.
 - 3. Slump Tests: Take slump tests per ASTM C 143 at the beginning of each day's placing operations and whenever water adjustments or noticeable change of slump occurs.
 - 4. Sampling:
 - a. Make five (5) standard cylinders at the beginning of each placement, and five (5) more standard cylinders for every 50 cubic yards placed. Take extra samples at noticeable change in the concrete makeup. Cure per ASTM C192.
 - b. Perform sampling in compliance with ASTM C 172.
 - 5. Testing: Test cylinders for compression in accordance with ASTM C 39.
 - a. Laboratory Cure: Two (2) standard cylinders in accordance to ASTM C 192.
 - b. Field Curing: Three (3) standard cylinders in accordance to ASTM C 31.
 - c. Test cylinders at seven (7) days and two (2) at twenty-eight (28) days, average test results. Test remaining cylinders at fifty-six (56) days.
- C. Soils Tests:
 - 1. Soil Analysis Methods: Make one (1) test for building area.

- a. Liquid Limit.
- b. Plastic Limit.
- c. Plasticity Index.
- d. One (1) maximum laboratory density test for every 30 yards of area.

D. Pavement Sub-grade Material:

- 1. Improved Sub-grade Material:
 - a. Type: Liquid limit and plasticity index.
 - b. Number: One (1) minimum for each type of soil.
- 2. Sieve Analysis: One (1) for each type of base course.
- 3. Field Density Tests:
 - a. Locations: Sub-grade, base courses, surface course.
 - b. Number: One (1) for each 1,000 square yards or fraction thereof.

E. Bolted Connections:

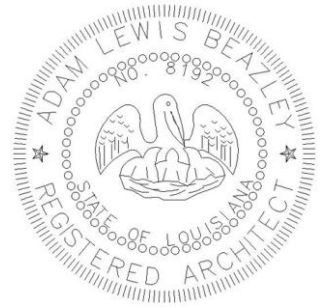
- 1. Types:
 - a. Calibrated torque wrench if washers are used.
 - b. If turn of nut method is used without washers, observe the set of every bolt.
- 2. Number for Torque Wrench Test: Test minimum two (2) bolts of every third connection between floor beams, girders and columns.
- 3. Analysis: If sufficient torque occurs on any tested bolt, test all bolts at that connection at the Contractor's expense.

F. Steel Weld Tests:

- 1. Types: One (1) of the following testing procedures may be used on any field or shop weld.
 - a. Liquid penetrant.
 - b. Magnetic particle.
 - c. Radiographic.
 - d. Ultrasonic.
- 2. Number of Tests: Percentage of welds tested will be determined by the number of welds that fail the initial testing.
- 3. All welds that fail shall be re-welded and retested until they pass the test. Test two (2) additional welds for every weld failure at the Contractor's expense.
- 4. Weld Quality: Comply with the quality requirements of the American Institute of Steel Construction Manual of Steel Construction.

END OF SECTION 01 40 00

SECTION 01 50 00 - TEMPORARY FACILITIES
AND CONTROLS



PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
 - 1. Section 01 10 00 "Summary" for work restrictions and limitations on utility interruptions.
 - 2. Section 32 13 13 "Concrete Paving" for construction and maintenance of cement concrete pavement for temporary roads and paved areas.

1.3 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's construction forces, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.
- B. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.4 INFORMATIONAL SUBMITTALS

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
- B. Erosion- and Sedimentation-Control Plan: Show compliance with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
- C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- D. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.

1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
 2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
 3. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
- E. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
1. Locations of dust-control partitions at each phase of Work.
 2. HVAC system isolation schematic drawing.
 3. Location of proposed air-filtration system discharge.
 4. Waste handling procedures.
 5. Other dust-control measures.

1.5 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Chain-Link Fencing: Minimum 2 inch (50 mm), 0.148 inch (3.8 mm) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8 inch (60 mm) OD line posts and 2-7/8 inch (73 mm) OD corner and pull posts, with 1-5/8 inch (42 mm)OD top rails.
- B. Portable Chain-Link Fencing: Minimum 2 inch (50-mm), 0.148 inch (3.8 mm) thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized-steel pipe posts; minimum 2-3/8 inch (60 mm) OD line posts and 2-7/8 inch (73 mm) OD corner and pull posts,

with 1-5/8 inch (42 mm) OD top and bottom rails. Provide galvanized-steel bases for supporting posts.

- C. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches (914 by 1624 mm).
- D. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.2 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
 - 3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction and clean HVAC system as required in Section 01 77 00 "Closeout Procedures"

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
 - 1. Locate facilities to limit site disturbance as specified in Section 01 10 00 "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

- B. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
 - 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.
 - a. Disconnect supply and return ductwork in Work area from HVAC systems servicing occupied areas.
 - b. Maintain negative air pressure within Work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
 - 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 - 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
- C. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity and power characteristics required for construction operations.
 - 1. Install electric power service overhead unless otherwise indicated.
- D. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
 - 1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
 - 2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Temporary Use of Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
 - 1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
 - 2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Section 31 21 00 "Earth Moving (Building Pad)".
- C. Traffic Controls: Comply with requirements of authorities having jurisdiction.

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- D. Parking: Use designated areas of Owner's existing parking areas for construction personnel.
- E. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
 2. Remove snow and ice as required to minimize accumulations.
- F. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
1. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. Provide temporary, directional signs for construction personnel and visitors.
 2. Maintain and touchup signs so they are legible at all times.
- G. Waste Disposal Facilities: Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."
- H. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
1. Comply with work restrictions specified in Section 01 10 00 "Summary."
- C. Temporary Erosion and Sedimentation Control: Comply with requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent and requirements specified in Section 31 10 00 "Site Clearing."
- D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- E. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

- F. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.
- G. Absolutely NO work, storage or other construction related activities are permitted within the drip lines of live oak trees.
- H. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
 - 1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
 - 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Furnish one set of keys to Owner.
- I. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- J. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- K. Covered Walkway: Erect protective, covered walkway for passage of individuals through or adjacent to Project site. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction and requirements indicated on Drawings.
 - 1. Construct covered walkways using scaffold or shoring framing.
 - 2. Provide overhead decking, protective enclosure walls, handrails, barricades, warning signs, exit signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage.
 - 3. Paint and maintain appearance of walkway for duration of the Work.
- L. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- M. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.
 - 1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
 - 2. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
 - 3. Insulate partitions to control noise transmission to occupied areas.
 - 4. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
 - 5. Protect air-handling equipment.
 - 6. Provide walk-off mats at each entrance through temporary partition.

- N. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
 - 1. Prohibit smoking in construction areas.
 - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
 - 4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.5 MOISTURE AND MOLD CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 - 1. Protect porous materials from water damage.
 - 2. Protect stored and installed material from flowing or standing water.
 - 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 - 4. Remove standing water from decks.
 - 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
 - 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 - 2. Keep interior spaces reasonably clean and protected from water damage.
 - 3. Periodically collect and remove waste containing cellulose or other organic matter.
 - 4. Discard or replace water-damaged material.
 - 5. Do not install material that is wet.
 - 6. Discard, replace, or clean stored or installed material that begins to grow mold.
 - 7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.
- D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
 - 1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 - 2. Use permanent HVAC system to control humidity.
 - 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
 - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for forty-eight (48) hours are considered defective.

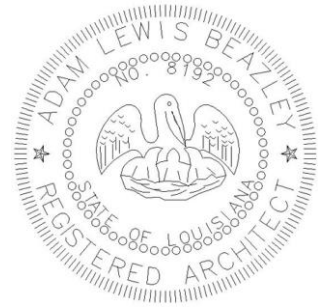
- b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for forty-eight (48) hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
- c. Remove materials that can not be completely restored to their manufactured moisture level within forty-eight (48) hours.

3.6 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a twenty-four (24) hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 - 2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
 - 3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 77 00 "Closeout Procedures."

END OF SECTION 01 50 00

SECTION 01 58 00 - PROJECT IDENTIFICATION SIGN



PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes requirements for the provision of temporary signs identifying the Project.
- B. Related Requirements:
 - 1. Section 01 50 00 "Temporary Facilities and Controls" for work restrictions and limitations on temporary facilities and installations.

1.3 OWNER FURNISHED INFORMATION

- A. The Architect will provide an electronic, printable layout and content for the sign.

PART 2 - PRODUCTS

2.1 SIGN DIMENSIONS AND LOCATION

- A. One (1) 8 by 8 foot Project sign as described herein and located as indicated in the Construction documents or as directed by the Architect.

2.2 SIGN CONSTRUCTION

- A. Sign Backing: 3/4 inch marine plywood.
- B. Mounting: Mounted sign on two (3) 4 by 4 inch (nominal) posts driven or set 36 inches into the ground with lateral supports as required to support sign panels.
- C. Sign Face: Face shall be printed foam core or plastic panels adhered to the plywood backing.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Contractor shall install the Project sign within two (2) weeks after Notice to Proceed.

- B. Locate sign as directed by the Architect.

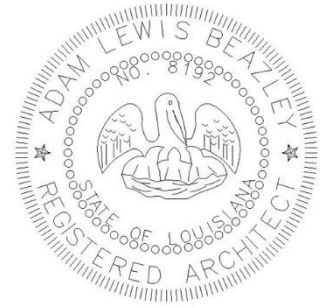
3.2 SIGN CONTENT

- A. Sign shall contain the following information:
 - 1. Project Name and caption if desired by the Owner.
 - 2. Rendering of facility.
 - 3. Logos of Architect and Contractor.
 - 4. Names of Architect and Consultants.
 - 5. Names of Contractor and major subcontractors.
 - 6. Names of the Owner and the owner's representatives.

3.3 REMOVAL

- A. Upon completion of the Work and prior to final acceptance, Contractor shall remove and dispose of the sign and restore the sign location to its required condition.

END OF SECTION 01 58 00



SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes administrative and procedural requirements for selection of products for use in project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.
- B. Related sections include the following:
 - 1. Section 01 25 13 "Product Substitution Request Form" for substitution requests of comparable, equivalent or equal products prior to bid.
 - 2. Division 1 Section "Closeout Procedures" for submitting warranties for Contract closeout.
 - 3. Division 1 Section "References" for applicable industry standards for products specified.
 - 4. Individual Product Sections: For specific requirements for warranties on products and installations specified to be warranted.

1.2 DEFINITIONS

- A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "materials", "equipment", "system" and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility, except that products consisting of recycled content materials are allowed. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable or Similar & Equivalent Product (as approved by Architect): Product that is demonstrated and approved through the procurement substitution process to have the indicated qualities related to type, function, dimension, in service performance, physical properties, appearance, warranty, maintenance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "Basis of Design", including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, warranty, maintenance, and other characteristics for purposes of evaluating comparable products or other named manufacturers.
- C. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor shall be submitted in accordance with Section 01 25 00 "Substitution Procedures".

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.3 SUBMITTALS

- A. Product List: Submit a list, in tabular form, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.
 1. Coordinate product list with Contractor's Construction Schedule and the submittals schedule.
 2. Form: Tabulate information for each product under the following column headings:
 - a. Specification section number and title.
 - b. Generic name used in the Contract Documents.
 - c. Proprietary name, model number, and similar designations.
 - d. Manufacturer's name and address.
 - e. Supplier's name and address.
 - f. Installer's name and address.
 - g. Project delivery date or time span of delivery period.
 - h. Identification of items that require early submittal for scheduled delivery date.
 3. Initial Submittal: Within thirty (30) days after date of commencement of the Work, submit three (3) copies of initial product list. Include a written explanation for omissions of data and for variations from Contract requirements.
 - a. At Contractor's option, initial submittal may be limited to product selections and designations that must be established in the first third of Contract time period.
 4. Completed List: Within sixty (60) days after date of commencement of Work, submit three (3) copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
 5. Architect's Action: Architect will respond in writing to Contractor within fifteen (15) days of receipt of completed product list. Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Architect's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.
- B. Comparable, Equivalent or Equal Product Requests: Submit request for consideration of each comparable, equivalent or equal product no later than seven (7) calendar days prior to bid. Identify product or fabrication or installation method to be substituted. Include Specification Section number and title and Drawing numbers and titles.
 1. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
 2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation. Architect will make notification of approval or

rejection of proposed comparable product request within seven (7) calendar days of receipt of request.

- a. Form for Submission: Section 01 25 13 "Product Substitution Request Form".
- b. Method of Approval: Addendum.
- c. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section "Submittal Procedures". Show compliance with requirements.

1.4 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two (2) or more products or systems for use on Project, product or system selected shall be compatible with products previously selected, even if previously selected products were also options.
 - 1. The Contractor is responsible for providing products and construction methods compatible with products and construction methods of the Contractor's work and his subcontractors' and vendors' work.
 - 2. If a dispute arises between contractors over concurrently selectable but incompatible products, the Architect will determine which products shall be used.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - 4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
- C. Storage:
 - 1. Store products to allow for inspection and measurement of quantity or counting of units.
 - 2. Store materials in a manner that will not endanger Project structure.
 - 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 - 4. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 - 5. Protect stored products from damage; and liquids from freezing.
 - 6. Provide a secure location and enclosure at project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

7. Store cementitious products and materials on elevated platforms.
8. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.

1.6 PRODUCT WARRANTIES

- A. Warranties specified in other sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
 1. Manufacturer's Standard Form: Modified to include project-specific information and properly executed.
 2. Specified Form: When specified forms are included with the specifications, prepare a written document using appropriate form properly executed.
 3. Refer to individual specification sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures".

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless indicated, that are new at time of installation.
 1. Provide products complete with accessories, trim, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected", Architect will make a selection. Contractor shall submit physical color charts, chips, or samples produced by the manufacturer or supplier as the Architect requires. Architect will not select colors from electronically transmitted or scanned color charts or chips.
 5. Where products are accompanied by the term "match sample", sample to be matched is Architect's. Contractor may request to view the Architect's sample before the date of bid. After execution of the construction contract, the Contract sum or time will not be increased or extended, respectively, for the Contractor to match the Architect's sample.

6. Descriptive, performance, and reference standard requirements in the specifications establish “salient characteristics” of products.
 7. Or Equal: Where products are specified by name and accompanied by the term “or equal” or “or approved equal” or “or approved,” comply with provisions in Part 2 “Comparable Products” article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures:
1. Products: Where specifications include a list of names of both products and manufacturers, provide one of the products listed. Comply with provisions in Part 2 “Comparable Products” Article for consideration of an unnamed product.
 2. Manufacturers: Where specifications include a list of manufacturers, provide a product by one of the manufacturers listed. Comply with provisions in Part 2 “Comparable Products” Article for consideration of an unnamed product.
 3. Product Options: Where specifications indicate that sizes, profiles, and dimensional requirements on drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Document “Procurement Substitution Procedures” Article for consideration of an unnamed product or system.
 4. Basis-of-Design Product: Where specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 “Comparable Products” Article for consideration of an unnamed product by the other named manufacturers.
 5. Where no manufacturers or products are listed: Provide products by manufacturers that meet requirements of the Specification Section in which they are listed.
 6. Visual Matching Specifications: Where specifications require matching an established sample, select a product that complies with requirements and matches Architect’s sample. Architect’s decision will be final on whether a proposed product matches.
 - a. If no product within specified category matches and complies with other specified requirements, comply with provisions in Part 2 “Product Substitutions” Article for proposal of product.
 7. Visual Selection Specifications: Where specifications include the phrase “as selected from manufacturer’s colors, patterns, textures” or a similar phrase, select a product that complies with other specified requirements.
 - a. Standard Range: Where specifications include the phrase “standard range of colors, patterns, textures” or similar phrase, Architect will select color, pattern, density, or texture from manufacturer’s product line that does not include premium items.
 - b. Full Range: Where specifications include the phrase “full range of colors, patterns, textures” or similar phrase, Architect will select color, pattern, density, or texture from manufacturer’s product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

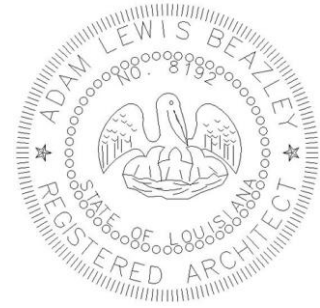
- A. Conditions: Architect will only consider Contractor’s request for comparable product(s) prior to bid. The request for consideration of a comparable product must also meet the

following requirements. If the following requirements are not satisfied, Architect will not return requests, except to record noncompliance with these requirements:

- B. Conditions: Architect will only consider Contractor's request for comparable product(s) prior to bid. The request for consideration of a comparable product must also meet the following requirements. If the following requirements are not satisfied, Architect will not return requests, except to record noncompliance with these requirements:
1. Evidence that the proposed product does not require extensive revision to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those named in the specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 3. Evidence that proposed product provides specified warranty and maintenance characteristics.
 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 5. Sample, if requested.

PART 3.0 - EXECUTION (NOT USED)

END OF SECTION 01 60 00



SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. Installation of the Work.
 - 4. Cutting and patching.
 - 5. Coordination of Owner-installed products.
 - 6. Progress cleaning.
 - 7. Starting and adjusting.
 - 8. Protection of installed construction.
- B. Related Requirements:
 - 1. Section 01 10 00 "Summary" for limits on use of Project site.
 - 2. Section 01 33 00 "Submittal Procedures" for submittals.
 - 3. Section 01 77 00 "Closeout Procedures" for submitting Project Record Documents, recording of Owner-accepted deviations, and final cleaning.
 - 4. Section 02 41 19 "Selective Demolition" for demolition and removal of selected portions of the building and site.
 - 5. Section 07 84 13 "Penetration Firestopping" for patching penetrations in fire-rated construction.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

- B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
1. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
 - a. Primary operational systems and equipment.
 - b. Fire separation assemblies.
 - c. Air or smoke barriers.
 - d. Mechanical systems piping and ducts.
 - e. Control systems.
 - f. Communication systems.
 - g. Fire-detection and -alarm systems.
 - h. Electrical wiring systems.
 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
 - a. Water, moisture, or vapor barriers.
 - b. Membranes and flashings.
 - c. Exterior curtain-wall construction.
 - d. Piping, ductwork, vessels, and equipment.
 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 01 31 00 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
 - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 2. Establish limits on use of Project site.
 - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 4. Inform installers of lines and levels to which they must comply.
 - 5. Check the location, level and plumb, of every major element as the Work progresses.
 - 6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
 - 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two (2) or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

- A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
 - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- B. Benchmarks: Re-establish existing or establish and maintain a minimum of two (2) permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
 - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.

3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 1. Make vertical work plumb and make horizontal work level.
 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
 4. Maintain minimum headroom clearance of 96 inches (2440 mm) in occupied spaces and 90 inches (2300 mm) in unoccupied spaces.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 2. Allow for building movement, including thermal expansion and contraction.
 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 10 00 "Summary."
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
 - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 6. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

- a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
- 3. Floors and Walls: Where walls or partitions that are removed, extend one (1) finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
- 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
- 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction personnel.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
 - 1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 - 2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.8 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold waste materials more than seven (7) days during normal weather or three (3) days if the temperature is expected to rise above 80 deg F (27 deg C).
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.

4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
-
- B. Site: Maintain Project site free of waste materials and debris.
 - C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
 - D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
 - E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
 - F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
 - G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 01 50 00 "Temporary Facilities and Controls."
 - H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
 - I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
 - J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.
-
- 3.9 STARTING AND ADJUSTING
- A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 01 91 13 "General Commissioning Requirements."
 - B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
 - C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
 - D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

- E. Manufacturer's Field Service: Comply with qualification requirements in Section 01 40 00 "Quality Requirements".

3.10 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 01 73 00



SECTION 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Salvaging nonhazardous demolition and construction waste.
 - 2. Disposing of nonhazardous demolition and construction waste.
- B. Related Requirements:
 - 1. Section 02 41 19 "Selective Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements.
 - 2. Section 31 10 00 "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

1.3 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 IMPLEMENTATION

- A. General: Provide handling, containers, storage, signage, transportation, and other items as required for waste collection and removal during the entire duration of the Contract.
 - 1. Comply with operation, termination, and removal requirements in Section 01 50 00 "Temporary Facilities and Controls."
- B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
- C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 - 2. Comply with Section 01 50 00 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

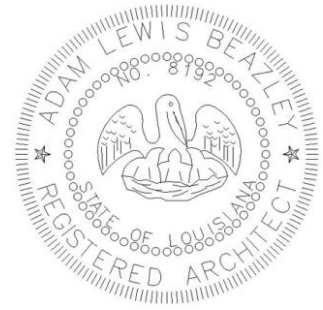
- A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 - 3. Store items in a secure area until installation.
 - 4. Protect items from damage during transport and storage.
- B. Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:
 - 1. Offer materials and products being removed to Owner as salvage. Salvage materials or products identified by the Owner as directed below, otherwise, dispose as waste.
Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:
 - 2. Clean salvaged items.
 - 3. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 - 4. Store items in a secure area as directed by Owner.
 - 5. Transport items to Owner's storage area designated by Owner.
 - 6. Protect items from damage during transport and storage.

- C. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.
- D. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.
- E. Plumbing Fixtures: Separate by type and size.
- F. Lighting Fixtures: Separate lamps by type and protect from breakage.
- G. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

3.3 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION 01 74 19



SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.
 - 5. Repair of the Work.
- B. Related Requirements:
 - 1. Section 01 73 00 "Execution" for progress cleaning of Project site.
 - 2. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 3. Section 01 78 39 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.3 ACTION SUBMITTALS

- A. Product Data: For cleaning agents.
- B. Contractor's List of Incomplete Items "Punch List": Initial submittal at Substantial Completion.
- C. Certified List of Completed "Punch List" Items: Final submittal at Final Completion.

1.4 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
 - 1. Lien and Privilege Certificate (Lien-free Certificate).
- B. Certificate of Insurance: For continuing coverage.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material (attic stock) submittal items specified in other Sections.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of ten (10) days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 2. Submit closeout submittals specified in other Division 01 Sections, including Project Record Documents, operation and maintenance manuals, final completion construction, damage or settlement surveys, property surveys, and similar final record information.
 - 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number where applicable.
 - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Architect's signature for receipt of submittals.
 - 5. Submit test/adjust/balance records.
 - 6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of ten (10) days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Advise Owner of pending insurance changeover requirements.
 - 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 - 3. Complete startup and testing of systems and equipment.
 - 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
 - 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in individual Specification Sections.
 - 6. Advise Owner of changeover in heat and other utilities.
 - 7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 - 8. Complete final cleaning requirements, including touchup painting.

9. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of ten (10) days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.7 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Section 01 29 00 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of ten (10) days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.

- d. Name of Contractor.
 - e. Page number.
4. Submit list of incomplete items in the following format:
- a. Three (3) paper copies. Architect will return two (2) copies.

1.9 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within fifteen (15) days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
 - 1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2 by 11 inch (215 by 280 mm) paper.
 - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
 - 4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
- D. Provide additional copies of each warranty to include in Operation and Maintenance Manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - g. Sweep concrete floors broom clean in unoccupied spaces.
 - h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - j. Remove labels that are not permanent.
 - k. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - l. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - m. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - n. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
 - 1) Clean HVAC system in compliance with NADCA Standard 1992-01. Provide written report on completion of cleaning.
 - o. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
 - p. Leave Project clean and ready for occupancy.
- C. Construction Waste Disposal: Comply with waste disposal requirements in Section 01 74 19 "Construction Waste Management and Disposal."

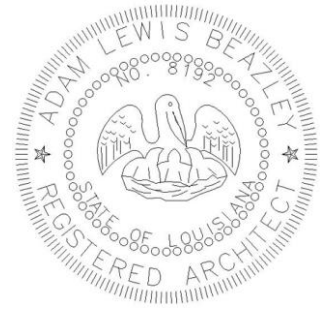
3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
 - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
 3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
 4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 01 77 00

SECTION 01 78 23 - OPERATION AND
MAINTENANCE DATA



PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory.
 - 2. Operation manuals for systems, subsystems, and equipment.
 - 3. Product maintenance manuals.
 - 4. Systems and equipment maintenance manuals.
- B. Related Requirements:
 - 1. Section 01 33 00 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
 - 2. Section 01 77 00 "Closeout Procedures" for submitting warranties.

1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 CLOSEOUT SUBMITTALS

- A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Architect will comment on whether content of operations and maintenance submittals are acceptable.
 - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operations and maintenance manuals in the following format:
 - 1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.

- a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
 - b. Enable inserted reviewer Comments on draft submittals.
2. Three (3) paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Architect will return two (2) copies.
- C. Initial Manual Submittal: Submit draft copy of each manual at least thirty (30) days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.
- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least fifteen (15) days before commencing demonstration and training. Architect will return copy with comments.
 1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within fifteen (15) days of receipt of Architect's comments and prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:
 1. List of documents.
 2. List of systems.
 3. List of equipment.
 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 - 1. Title page.
 - 2. Table of contents.
 - 3. Manual contents.
- B. Title Page: Include the following information:
 - 1. Subject matter included in manual.
 - 2. Name and address of Project.
 - 3. Name and address of Owner.
 - 4. Date of submittal.
 - 5. Name and contact information for Contractor.
 - 6. Name and contact information for Architect.
 - 7. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
 - 1. If operation or maintenance documentation requires more than one (1) volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
 - 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 - 2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
- F. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.
 - 1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2 by 11 inch (215 by 280 mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

- a. If two (2) or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, subject matter of contents. Indicate volume number for multiple-volume sets.
2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
4. Supplementary Text: Prepared on 8-1/2 by 11 inch (215 by 280 mm) white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
 1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 2. Performance and design criteria if Contractor has delegated design responsibility.
 3. Operating standards.
 4. Operating procedures.
 5. Operating logs.
 6. Wiring diagrams.
 7. Control diagrams.
 8. Piped system diagrams.
 9. Precautions against improper use.
 10. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
 1. Product name and model number. Use designations for products indicated on Contract Documents.
 2. Manufacturer's name.
 3. Equipment identification with serial number of each component.
 4. Equipment function.
 5. Operating characteristics.
 6. Limiting conditions.
 7. Performance curves.
 8. Engineering data and tests.
 9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.4 PRODUCT MAINTENANCE MANUALS

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Product Information: Include the following, as applicable:
1. Product name and model number.
 2. Manufacturer's name.
 3. Color, pattern, and texture.
 4. Material and chemical composition.
 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
1. Inspection procedures.
 2. Types of cleaning agents to be used and methods of cleaning.
 3. List of cleaning agents and methods of cleaning detrimental to product.
 4. Schedule for routine cleaning and maintenance.
 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.
 2. Include original warranties as required in Section 01 77 00 "Closeout Procedures".

2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
 - 1. Standard maintenance instructions and bulletins.
 - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 - 3. Identification and nomenclature of parts and components.
 - 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
 - 1. Test and inspection instructions.
 - 2. Troubleshooting guide.
 - 3. Precautions against improper maintenance.
 - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - 5. Aligning, adjusting, and checking instructions.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
 - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.
 - 2. Include original warranties as required in Section 01 77 00 "Closeout Procedures".

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
 - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- D. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one (1) item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
 - 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
 - 1. Do not use original Project Record Documents as part of operation and maintenance manuals.
 - 2. Comply with requirements of newly prepared record Drawings in Section 01 78 39 "Project Record Documents."
- F. Comply with Section 01 77 00 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 01 78 23



SECTION 01 78 39 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
 - 1. Record Drawings.
- B. Related Requirements:
 - 1. Section 01 73 00 "Execution" for final property survey.
 - 2. Section 01 77 00 "Closeout Procedures" for general closeout procedures.
 - 3. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one (1) set(s) of marked-up record prints.
 - 2. Number of Copies: Submit copies of record Drawings as follows:
 - a. Final Submittal:
 - 1) Submit one (1) paper-copy set(s) of marked-up record prints (Contractor's "Redline" set).
 - 2) Submit PDF electronic files of scanned record prints.
- B. Record Submittals: Submit one (1) paper copy and a PDF electronic file of all submittals required by Section 01 33 00 "Submittal Procedures".

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one (1) set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding archive photographic documentation.
 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations below first floor.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by Change Order or Construction Change Directive.
 - k. Changes made following Architect's written orders.
 - l. Details not on the original Contract Drawings.
 - m. Field records for variable and concealed conditions.
 - n. Record information on the Work that is shown only schematically.
 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Format: Annotated PDF electronic file with comment function enabled.
 3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
 4. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect.
 - e. Name of Contractor.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one (1) copy of each submittal during the construction period for Project Record Document purposes. Post changes and revisions to Project Record Documents as they occur; do not wait until end of Project.
- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

END OF SECTION 01 78 39

SECTION 02 41 19 - SELECTIVE DEMOLITION



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. Demolition and removal of selected portions of the existing site, building or structure to attach the new construction to the existing building as indicated on the Drawings.
- B. Related Requirements:
 - 1. Section 01 10 00 "Summary" for restrictions on the use of the premises, Owner-occupancy requirements, and phasing requirements.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage and deliver to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, prepare for reuse and reinstall where indicated.
- D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 INFORMATIONAL SUBMITTALS

- A. Pre-Demolition Photographs or Video: Submit before Work begins.

1.6 FIELD CONDITIONS

- A. Owner's Lessees will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's Lessees' operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate Contract.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review Record Documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Record Documents.

- C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- E. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.
 - 1. Inventory and record the condition of items to be removed and salvaged. Provide photographs of conditions that might be misconstrued as damage caused by salvage operations.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Arrange to shut off indicated utilities with utility companies.
 - 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 3. Disconnect, demolish and remove fire-suppression systems, plumbing, HVAC systems, equipment, and components indicated to be removed.
 - a. Piping may be abandoned in place:
 - 1) Drain piping and cap or plug piping with same or compatible piping material.
 - 2) Do not leave piping in place if it interferes with other construction or impairs the structural integrity of foundation systems.

3.3 PREPARATION

- A. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
 - 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 50 00 "Temporary Facilities and Controls."
- B. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of

construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

3.4 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 2. Neatly cut openings and holes plumb, square and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
 5. Maintain adequate ventilation when using cutting torches.
 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 9. Dispose of demolished items and materials promptly, off site and in a manner that complies with all applicable laws.
- B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, then remove concrete between saw cuts.
- B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.
- C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

- D. Roofing: Remove no more existing roofing than what can be covered in one (1) day by new roofing and so that building interior remains watertight and weathertight. See Section 07 52 16 "SBS Modified Bituminous Membrane Roofing" for new roofing requirements.

1. Remove existing roof membrane, flashings, copings, and roof accessories.
2. Remove existing roofing system down to substrate.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

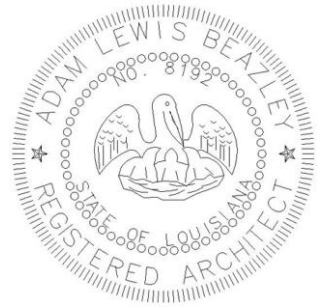
- A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
1. Do not allow demolished materials to accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.7 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02 41 19

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE



PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

1.2 SUMMARY

- A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
 - 1. Footings.
 - 2. Slabs-on-grade.
 - 3. Building walls.

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement. None of the following are allowed in any concrete in this Project: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: Submit a design mixture for each concrete mixture, proportioned on the basis of field experience or trial mixtures, or both, as required by ACI 318-08, Chapter 5. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Historical data used as the basis of concrete proportioning: Submit historical data and sample standard deviation calculations, as required by ACI 318-08, Chapter 5.
- D. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- E. Field quality-control test and inspection reports.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs qualified personnel on the Project, Flatwork Technicians with at least three (3) years experience, Finishers with at least three (3)

years experience and a Supervisor with at least ten (10) years experience in concrete finishing and flatwork.

- B. **Manufacturer Qualifications:** A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- C. **Testing Agency Qualifications:** An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
 - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
 - 2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.
- D. **Source Limitations:** Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one (1) source from a single manufacturer.
- E. **Welding:** Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code-Reinforcing Steel".
- F. **ACI Publications:** Comply with the following unless modified by requirements in the Contract Documents:
 - 1. ACI 301, "Specification for Structural Concrete for Buildings".
 - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials".
- G. **Concrete Testing Service:** Owner shall engage (and pay for) a qualified independent testing agency to perform material evaluation tests. Contractor shall engage and pay a qualified independent testing agency to design concrete mixtures.
- H. **Materials and installed Work** may require testing and retesting, as directed by Architect, at anytime during progress of Work. Allow free access to material stockpiles and facilities. Tests, including retesting of rejected materials for installed Work, shall be done at Contractor's expense.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. **Steel Reinforcement:** Deliver, store, and handle steel reinforcement to prevent bending and damage.
- B. **Waterstops (if required):** Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

- A. Forms for Exposed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
 - 1. Plywood, metal, or other pre-approved panel materials.
 - a. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.
- B. Forms for Unexposed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two (2) edges and one (1) side for tight fit.
 - 1. Form foundation elements as indicated on Contract Documents (typically placed in General Notes of the Structural Plans).
- C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
- D. Chamfer Strips (if required): Wood, metal, PVC, or rubber strips, 3/4 inch by 3/4 inch, minimum.
- E. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- F. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
 - 1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
 - 2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
 - 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Plain-Steel Wire: ASTM A 82.
- C. Deformed-Steel Wire: ASTM A 496.
- D. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

- E. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.

2.3 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars (if required): ASTM A 615/A 615M, Grade 60, plain-steel bars, cut bars true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.

2.4 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
 - 1. Portland Cement: ASTM C 150, Type I/II unless otherwise acceptable to Architect.
- B. Normal-Weight Aggregates: ASTM C 33, coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
 - 1. Maximum Coarse-Aggregate Size: 1 inch nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Lightweight Aggregate: ASTM C 330, 3/4 inch nominal maximum aggregate size.
- D. Water: ASTM C 94/C 94M and potable

2.5 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260 – Do not use in slabs scheduled to receive dry shake floor hardener.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.6 WATERSTOPS

- A. Swellstop Waterstops: Contractor shall install a swellable VOLCLAY waterproofing strips that swells upon contact with water to form a long-lasting compression seal in non-moving concrete joints.

2.7 VAPOR RETARDERS

- A. Plastic Vapor Retarder: ASTM E 1745-09, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape. The vapor retarder shall maintain a permeance of less than .01 perms as tested before and after mandatory conditioning tests (per ASTM E 1745 Section 7.1 and Sub-paragraphs 7.1.2-5).

1. Available Products:

- a. Fortifiber Corporation; Moistop Ultra.
 - b. Raven Industries Inc.; Vapor Block.
 - c. Stego Industries, LLC; Stego Wrap.
 - d. Viper VaporCheck
 - e. Tex-Trude, LP; Xtreme Vapor Barrier.
 - f. IntePlus XF Film; Barrier-Bac.
- 2. Refer to Contract Plan Documents for minimum vapor retarder thickness in mils.
 - 3. Vapor proofing mastic: water vapor transmission rate per ASTM E 96 of 0.3 perms or lower.
 - 4. Seam tape: must have a water vapor transmission rate of 0.3 perms or lower in accordance with ASTM E 96.

2.8 CURING MATERIALS

- A. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- B. Curing compounds must be approved for use with types of floor finishes and sealers/hardeners specified in Division 3 section "Special Concrete Finishes." Curing compound shall not interfere with bonding of floor covering. The following list of compounds does not indicate acceptance with the floor finishes utilized. Contractor shall only submit for approval curing compounds that are guaranteed not to interfere with bonding of any floor covering. Contractor assumes all responsibility for compliance of curing compounds with respect to this requirement.
- C. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

1. Available Products:

- a. Ashford Formula.
- b. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
- c. Burke by Edoco; Aqua Resin Cure.
- d. ChemMasters; Safe-Cure Clear.
- e. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; W.B. Resin Cure.
- f. Dayton Superior Corporation; Day Chem Rez Cure (J-11-W).
- g. Euclid Chemical Company (The); Kurez DR VOX.
- h. Kaufman Products, Inc.; Thinfil 420.

- i. Lambert Corporation; Aqua Kure-Clear.
 - j. L&M Construction Chemicals, Inc.; L&M Cure R.
 - k. Meadows, W. R., Inc.; 1100 Clear.
 - l. Nox-Crete Products Group, Kinsman Corporation; Resin Cure E.
 - m. Symons Corporation, a Dayton Superior Company; Resi-Chem Clear Cure.
 - n. Tamms Industries, Inc.; Horncrete WB 30.
 - o. Unitex; Hydro Cure 309.
 - p. US Mix Products Company; US Spec Maxcure Resin Clear.
 - q. Vexcon Chemicals, Inc.; Certi-Vex Enviocure 100.
- D. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, non-dissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.
1. Available Products:
- a. Ashford Formula.
 - b. Anti-Hydro International, Inc.; AH Clear Cure WB.
 - c. Burke by Edoco; Spartan Cote WB II.
 - d. ChemMasters; Safe-Cure & Seal 20.
 - e. Conspec Marketing & Manufacturing Co., Inc., a Dayton Superior Company; Cure and Seal WB.
 - f. Dayton Superior Corporation; Safe Cure and Seal (J-18).
 - g. Euclid Chemical Company (The); Aqua Cure VOX.
 - h. Kaufman Products, Inc.; Cure & Seal 309 Emulsion.
 - i. Lambert Corporation; Glazecote Sealer-20.
 - j. L&M Construction Chemicals, Inc.; Dress & Seal WB.
 - k. Meadows, W. R., Inc.; Vocomp-20.
 - l. Metalcrete Industries; Metcure.
 - m. Nox-Crete Products Group, Kinsman Corporation; Cure & Seal 150E.
 - n. Symons Corporation, a Dayton Superior Company; Cure & Seal 18 Percent E.
 - o. Tamms Industries, Inc.; Clearseal WB 150.
 - p. Unitex; Hydro Seal.
 - q. US Mix Products Company; US Spec Hydrasheen 15 percent.
 - r. Vexcon Chemicals, Inc.; Starseal 309.

2.9 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips (if required): ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork.
- B. Bonding Agent (if required): ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- C. Epoxy Bonding Adhesive (if required): ASTM C 881, two (2) component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
 - 1. Provide material "type", "grade" and "class" to suit Project requirements.
- D. Reglets (if required): Fabricate reglets of not less than 0.0217 inch thick, galvanized steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

- E. Dovetail Anchor Slots (if required): Hot-dip galvanized steel sheet, not less than 0.0336 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.10 REPAIR MATERIALS

- A. Repair Underlayment (if required): Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C 150, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
 - 4. Compressive Strength: Not less than 4100 psi at twenty-eight (28) days when tested according to ASTM C 109/C 109M.
- B. Repair Overlayment (if required): Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C 150, Portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
 - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
 - 4. Compressive Strength: Not less than 5000 psi at twenty-eight (28) days when tested according to ASTM C 109/C 109M.

2.11 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
 - 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Limit water-soluble, chloride-ion content in hardened concrete to 0.1 percent by weight of cement.
- C. The design mixtures for all exterior concrete shall provide a minimum of 4.5 percent entrained air.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
 - 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.
5. If more than one admixture is used in a concrete mix, assure that only compatible admixtures are used.

2.12 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Design mixes to provide concrete with the properties as indicated on the structural Drawings.

2.13 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice".

2.14 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information. The time concrete is unloaded shall be recorded on each batch ticket.
 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from one-one-half (1-1/2) hours to seventy-five (75) minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to sixty (60) minutes.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
 1. Class A, 1/8 inch for smooth-formed finished surfaces.
 2. Class C, 1/2 inch for rough-formed finished surfaces.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 1. Install keyways, reglets, recesses, and the like, for easy removal.
 2. Do not use rust-stained steel form-facing material.

- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete, unless otherwise indicated.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete. Use setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
 - 2. Install and secure anchor rods prior to placing of concrete.
 - 3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
 - 4. Install dovetail anchor slots in concrete structures as indicated.
- B. Do not run conduit horizontally through concrete slabs, unless approved by Architect.

3.3 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for twenty-four (24) hours after placing concrete, if concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.
 - 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved its twenty-eight (28) day design compressive strength but in no case shall forms be removed sooner than ten (10) days from placing of concrete for such elements.

2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 VAPOR RETARDERS

- A. Plastic Vapor Retarders: Place, protect, and repair vapor retarders according to ASTM E 1643-09 and manufacturer's written instructions.
 1. Lap joints 6 inches and seal with manufacturers' recommended tape.
 2. Repair damaged areas by cutting patches of required vapor retarder, overlapping damaged area 6 inches and taping all four (4) sides with approved tape.
 3. Seal all penetrations (including pipes) per manufacturer's instructions.

3.5 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
 1. Weld reinforcing bars according to AWS D1.4, where indicated.
- D. Maximum spacing of bar supports for slab/mat reinforcement shall be 48 inches on center or less as required to secure reinforcement during construction operations.
- E. Precast concrete blocks shall only be used to support reinforcement from the ground. Concrete blocks shall not be used for support of top reinforcement in concrete slabs or mats.
- F. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- G. Install bar reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap ends of bars as indicated on the structural Contract Drawings.
- H. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces as specified on Drawings or a minimum of two (2) full mesh if not otherwise specified. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.6 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 1. Place joints perpendicular to main reinforcement. Do not continue reinforcement through sides of strip placements of floors and slabs (unless noted otherwise on Drawings).
 - 2. Form joints as indicated on Drawings. Do not use metal keyways.
 - 3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 - 4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 - 5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
 - 6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 - 7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 - 8. Construction joints shall not be placed in any slab areas with floor coverings prone to cracking, unless written approval is provided the Architect. When construction joints are allowed in slab areas with floor coverings prone to cracking, the Contractor shall assure that joints are properly considered in floor covering installation as required to prevent reflective cracking.
- C. Isolation Joints in Slabs-on-Grade (if required): After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 - 1. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Division 7 Section "Joint Sealants," are indicated.
 - 2. Install joint-filler strips in lengths as long as practicable. Where more than one (1) length is required, lace or clip sections together.
- D. Doweled Joints (as indicated on Drawings): Install dowel bars and support assemblies at joints where indicated.

3.7 WATERSTOPS

- A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.
- B. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.
 - 1. Place at locations indicated on plans.
 - 2. Place at concrete construction joints below site grade in order to avoid water intrusion into interior space.

- a. Place at wall to slab (or mat foundation) joints below site grade.
- b. Place at wall-to-wall joints below site grade.

3.8 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
 - 1. All embedded items, including anchor bolts, rebar dowels, etc. shall be set prior to placement of concrete.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- C. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Deposit concrete continuously in one (1) layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 - 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
 - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
 - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
 - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Maintain reinforcement in position on chairs during concrete placement.
 - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
 - 4. Slope surfaces uniformly to drains where required.
 - 5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 1. When average high and low temperature is expected to fall below 40 deg F for three (3) successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 - 2. Do not place concrete when temperature is 36 deg F or below or if temperature is expected to reach 36 deg F (or below) within twelve (12) hours of the anticipated time for completing a concrete pour.

3. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
4. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

G. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

3.9 FINISHING FORMED SURFACES

A. Rough-Formed Finish: (For formed concrete surfaces not exposed to view) As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: (For formed concrete surfaces exposed to view) As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces to receive a rubbed finish.

C. Rubbed Finish: Consult with Project Architect to determine the type of rubbed finish prior to pouring of concrete. Apply the following to smooth-formed finished as-cast concrete where indicated:

1. Smooth-Rubbed Finish: Not later than one (1) day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one (1) part Portland cement to one (1) and one-half (1/2) parts fine sand with a 1:1 mixture of bonding admixture and water. Add white Portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least thirty-six (36) hours.
3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix one (1) part Portland cement and one (1) part fine sand with a 1:1 mixture of bonding agent and water. Add white Portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.10 FINISHING FLOORS AND SLABS

A. General:

1. Comply with ACI 302.1R recommendations for screeding, re-straightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
2. See architectural drawings for slab finish requirements or consult the Project Architect if finishes have not been supplied on the architectural Drawings.

B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in one (1) direction.

1. Apply scratch finish to surfaces to receive concrete floor toppings and to receive mortar setting beds for bonded cementitious floor finishes.

C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Re-straighten, cut down high spots, and fill low spots. Repeat float passes and re-straightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces indicated, to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and re-straighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces indicated, exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.

a. Finish surfaces to the following tolerances, see structural drawings.

E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.

1. Comply with flatness and levelness tolerances for trowel finished floor surfaces.

F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.
2. After curing, lightly work surface with a steel wire brush or an abrasive stone and water to expose slip-resistive aggregate.

G. Slip-Resistive Finish: Before final floating, apply slip-resistive aggregate finish where indicated and to concrete stair treads, platforms, and ramps. Apply according to manufacturer's written instructions and as follows:

1. Uniformly spread dampened slip-resistive aggregate over surface in one (1) or two (2) applications. Tamp aggregate flush with surface, but do not force below surface.
2. After broadcasting and tamping, apply float finish.
3. After curing, lightly work surface with a steel wire brush or an abrasive stone and water to expose slip-resistive aggregate.

3.11 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

3.12 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. by h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one (1) or a combination of the following methods:
 1. Moisture Curing: Keep surfaces continuously moist for not less than seven (7) days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12 inch lap over adjacent absorptive covers.
 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than

seven (7) days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

- a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
 - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
 - c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three (3) hours after initial application. Maintain continuity of coating and repair damage during curing period.
- a. After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

3.13 JOINT FILLING

- A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
 1. Defer joint filling until concrete has aged at least one (1) month(s). Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semi-rigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.14 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part Portland cement to two and one-half (1 1/2) parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete, but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view by blending white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
1. Repair finished surfaces containing defects. Surface defects include spalls, pop-outs, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 2. After concrete has cured at least fourteen (14) days, correct high areas by grinding.
 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4 inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least seventy-two (72) hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

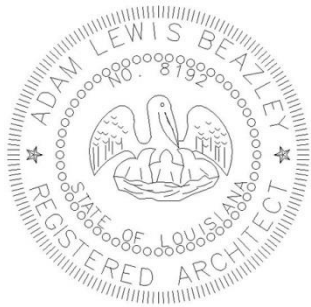
3.15 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a special inspector to perform field tests and inspections and prepare test reports.
- B. Inspections:

1. Steel reinforcement placement.
 2. Headed bolts and studs.
 3. Verification of use of required design mixture.
 4. Mixing and delivery time for concrete.
 - a. Record the time batched, time arrived, and the time unloaded for each batch of concrete.
 5. Concrete placement, including conveying and depositing.
 6. Curing procedures and maintenance of curing temperature.
 7. Verification of concrete strength before removal of shores and forms from beams and slabs.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain one (1) composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one (1) set for each additional 50 cu. yd. or fraction thereof.
 - a. When frequency of testing will provide fewer than five (5) compressive-strength tests for each concrete mixture, testing shall be conducted from at least five (5) randomly selected batches or from each batch if fewer than five (5) are used.
 2. Slump: ASTM C 143/C 143M; one (1) test at point of discharge for each composite sample, but not less than one (1) test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change or is questionable.
 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one (1) test for each composite sample, but not less than one (1) test for each day's pour of each concrete mixture.
 4. Concrete Temperature: ASTM C 1064/C 1064M; one (1) test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one (1) test for each composite sample.
 5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one (1) test for each composite sample, but not less than one (1) test for each day's pour of each concrete mixture.
 6. Compression Test Specimens: ASTM C 31/C 31M.
 - a. Cast and laboratory cure four (4) standard cylinder specimens for each composite sample.
 7. Compressive-Strength Tests: ASTM C 39/C 39M.
 - a. Test one (1) specimen at seven (7) days, two (2) specimens at twenty-eight (28) days, and hold one (1) specimen for testing at fifty-six (56) days, if necessary.
 - b. A compressive-strength test shall be the average compressive strength from a set of two (2) specimens obtained from same composite sample and tested at age indicated.
 8. Strength of each concrete mixture will be satisfactory if every average of any three (3) consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.

9. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within forty-eight (48) hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at twenty-eight (28) days, concrete mixture proportions and materials, concrete unit weight, compressive breaking strength, and type of break for both seven (7) and twenty-eight (28) day tests.
 10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
 11. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
 12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
 13. Correct deficiencies in the Work that test reports and inspections indicate does not comply with the Contract Documents.
- D. Measure floor and slab flatness and levelness, per requirements on Drawings, according to ASTM E 1155 within seventy-two (72) hours of finishing.

END OF SECTION 03 30 00



SECTION 03 35 11 – CONCRETE FLOOR FINISHES

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the following.
 - 1. Applying sealer and hardener, and polishing concrete to specified finish level.
- B. Related Work:
 - 1. Section 03 30 00 "Cast-In-Place Concrete".

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 33 00 – "Submittal Procedures".
 - 1. Provide submittal information within thirty-five (35) calendar days after the Contractor has received the Owner's Notice to Proceed.
- B. Product data:
 - 1. Submit special concrete finishes manufacturer's specifications and test data.
 - 2. Submit special concrete finishes describing product to be provided, giving manufacturer's name and product name for the specified material proposed to be provided under this section.
 - 3. Submit special concrete finishes manufacturer's recommended installation procedures.
 - 4. Submit special concrete finishes technical data sheet giving descriptive data, curing time, and application requirements.
 - 5. Submit special concrete finishes manufacturer's Material Safety Data Sheet (MSDS) and other safety requirements.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Use an experienced installer and adequate number of skilled workmen who are thoroughly trained and experienced in the necessary craft.
 - 2. The special concrete finish manufacturer shall certify applicator.
 - 3. Applicator shall be familiar with the specified requirements and the methods needed for proper performance of Work of this section.
- B. Mock-ups:
 - 1. Apply mock-ups of each type finish, to demonstrate typical joints, surface finish, color variation (if any), and standard of workmanship.
 - a. Build mock-ups approximately 10 feet square in the location indicated as directed by the Architect.
 - b. Notify Architect or Owner Representative seven days in advance of dates and times when mock-ups will be constructed.
 - c. Obtain from the Architect or Owner Representative approval of mock-ups before starting construction.

- d. Maintain mock-ups during construction in an undisturbed condition as a standard for judging the completed Work.
- e. Approved mock-ups may become part of the completed Work if undisturbed at time of Substantial Completion.

C. Protection

- 1. No satisfactory chemical or cleaning procedure is available to remove petroleum stains from the concrete surface. Prevention is therefore essential.
 - a. All hydraulic powered equipment must be diapered to avoid staining of the concrete.
 - b. No trade will park vehicles on the inside slab. If necessary to complete their scope of work, drop cloths will be placed under vehicles at all times.
 - c. No pipe cutting machine will be used on the inside floor slab.
 - d. Steel will not be placed on interior slab to avoid rust staining.
 - e. Acids and acidic detergents will not come into contact with slab.
 - f. All trades informed that the slab must be protected at all times.
 - g. Provide appropriate floor protection measures to prevent the slab from being damaged during construction.

D. Pre-Installation Conference:

- 1. Conduct pre-installation conference at project at least seven (7) days before beginning finishing work.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original containers, with seal's unbroken, bearing manufacturer labels indicating brand name and directions for storage.
- B. Dispense special concrete finish material from factory numbered and sealed containers. Maintain record of container numbers.

1.6 PROJECT CONDITIONS

- A. Environmental limitations:
 - 1. Comply with manufacturers written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation, and other conditions affecting topping performance.
 - a. Concrete Floor Flatness rating recommended at least 40, where possible.
 - b. Concrete Floor Levelness rating recommended at least 30, where possible.
 - c. Application of Retro-Plate shall take place 10 days prior to installation of equipment and substantial completion, thus providing a complete, uninhibited concrete slab for application.
- B. Close areas to traffic during floor application and after application, for time period recommended in writing by manufacturer.

PART 2 – PRODUCTS

2.1 MATERIALS AND MANUFACTURERS

- A. Hardening/Sealing Agent:
 - 1. Retro-Plate 99, manufactured by Advanced Floor Products, Inc., 1203 Spring Creek Place, Springville, Utah 84663, 801-489-5663.
 - a. Performance Criteria:
 - i. Abrasion Resistance: ASTM C779 – Up to 400 percent increase in

- abrasion resistance.
- ii. Impact Strength: ASTM C805 – Up to 21 percent increase impact strength.
- iii. Ultra Violet Light and Water Spray: ASTM G23-81 – No adverse effect to ultra violet and water spray.
- iv. Reflectivity: Up to 30 percent increase in reflectivity.

- B. Aggregate Exposure: Class A – Cement Fines (Cream)
- C. Finish Gloss: Level 4 – Satin (100-400 grit)

2.2 RELATED MATERIALS

- A. Neutralizing Agent:
 - 1. Tri-sodium Phosphate
- B. Polished Concrete Dye Color:
 - 1. Final dye color will be determined during mock-up review when specified for per project; Note: dye appearance is affected by the color of the concrete mix, along with the light source under which it will be viewed.
- C. Chemical Strippers:
 - 1. CreteStrip
- D. Grinding Accelerant:
 - 1. KickStart
- E. Joint, Crack & Spall Repair System:
 - 1. CreteFill – Pro Series
- F. Water:
 - 1. Potable

PART 3 - EXECUTION

3.1 CONCRETE MATERIALS

- A. Cementitious Material: At all areas to receive Retro-Plate Polished Finish, use the following cementitious materials of the same type, brand, color and source:
 - 1. Portland Cement: ASTM C 150, Type II.

3.2 PROTECTING & CURING

- A. General: Protect freshly placed concrete from premature drying and excess hot or cold temperatures.
- B. Moisture Retaining Cover:
 - 1. Curing: Cover concrete with absorptive cover at all areas to receive Retro-Plate Polished Finish.
 - a. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz/sq.yd. when dry.
 - b. Curing compounds shall not be used on polished concrete surface.

3.3 JOINTS

- A. Saw Joints: At all areas to receive Retro-Plate Polished Finish, provide soft cut

saw joints in pattern indicated on Drawings at 1 inch depth, within eighteen (18) hours of concrete placement.

3.4 SURFACE CONDITIONS:

- A. Examine substrate, with installer present, for conditions affecting performance of finish. Correct conditions detrimental to timely and proper Work. Do not proceed until unsatisfactory conditions are corrected.
- B. Verify that base slab meets finish and surface profile requirements in Section 03 30 00 - "Cast-In-Place Concrete," and Project Conditions above.
- C. Prior to application, verify that floor surfaces are free of construction latents.

3.5 EXISTING CONCRETE FLOORS

- A. Remove existing floor coverings and/or coatings chemically by utilizing approved chemical stripping agent and grinding the concrete surface until all residue has been adequately removed.

3.6 APPLICATION

- A. Start any of the floor finish applications in presence of manufacturer's technical representative.
- B. Sealing, Hardening and Polishing of Concrete Surface: Minimum Double Mobilization.
 - 1. Initial Mobilization: Initial Grind (200 Grit) and Densifying.
 - a. Concrete must be in place a minimum of seven (7) days or as directed by the manufacturer before application can begin.
 - b. Application is to take place seven (7) days after placement of concrete, thus providing a complete, uninhibited concrete slab for application
 - c. Only a certified applicator shall apply Retro-Plate 99. Applicable procedures must be followed as recommended by the product manufacturer and as required to match approved test sample.
 - d. Protect floor as recommended by product manufacturer.
 - 2. Secondary/Final Mobilization: Final Polishing.
 - a. Polish to required sheen level.
 - b. Achieve waterproofing, hardening, dust-proofing, and abrasion resistance of the surface without changing the natural appearance of the concrete, except for the sheen.

3.7 WORKMANSHIP AND CLEANING:

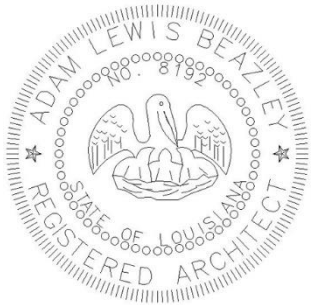
- A. The premises shall be kept clean and free of debris at all times.
- B. Remove spatter from adjoining surfaces, as necessary.
- C. Repair damages to surface caused by cleaning operations.
- D. Remove debris from jobsite
 - 1. Dispose of materials in separate, closed containers in accordance with local regulations.

3.8 PROTECTION:

- A. Protect finished work until fully cured in accordance with manufacturer's recommendations.
 - 1. Provide cover board to protect polished surfaces during construction. Do not remove until all overhead or finishing work is complete.

END OF SECTION 03 35 11

SECTION 04 20 00 - MASONRY VENEER



PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Clay Facing Brick.
- B. Mortar and Grout.
- C. Reinforcement and Anchorage.
- D. Flashings.
- E. Installation of Lintels.
- F. Accessories.

1.2 RELATED REQUIREMENTS

- B. Section 07 21 00 "Thermal Insulation".
- C. Section 07 92 00 "Joint Sealants": Sealing control and expansion joints.
- D. Section 09 91 13 "Exterior Painting": Field finishing of exposed steel lintels.
- E. Section 09 91 23 "Interior Painting": Field finishing of exposed steel lintels.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene one (1) week before starting Work of this section.

1.4 SUBMITTALS

- A. Product Data: Provide data for masonry units, mortar, and anchors.
- B. Samples: Submit four (4) samples of facing brick units to illustrate color, texture, and extremes of color range.
- C. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1.5 QUALITY ASSURANCE

- A. Comply with provisions of ACI 530/530.1/ERTA, except where exceeded by requirements of the Contract Documents.
- B. Single Source Responsibility:
 - 1. For Masonry Units: Obtain masonry units of uniform texture and color, or a uniform blend within the accepted ranges for those characteristics, from one (1) manufacturer for each different product required for each continuous surface or visually related surfaces.

2. For Mortar and Grout Materials: Brands of cementitious materials and admixtures and the source of supply of sand and aggregates shall remain the same throughout the Work where exposed to view and where not scheduled to receive a subsequently applied finish, i.e. parging, painting, etc., unless directed otherwise in writing by the Owner.
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
1. Build mockups for each type of exposed unit masonry construction in sizes approximately 72 inches (1800 mm) long by 60 inches (1500 mm) high by full thickness, including face and backup wythes and accessories.
 - a. Return brick around one end of mockup and for 32 inches along the interior side of the wall.
 - b. Include soldier course (2 brick high) at top edge of Mockup. Include corner condition.
 - c. Include metal studs, sheathing, water-resistive barrier, veneer anchors, cavity drainage material, and weep holes in exterior masonry-veneer wall mockup.
 - d. Clean one-half of exposed faces of mockups with masonry cleaner as indicated.
 - e. Protect accepted mockups from the elements with weather-resistant membrane.
 - f. Approval of mockups is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; and aesthetic qualities of workmanship.
 - g. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
 - h. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 FIELD CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's Work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches (600 mm) down both sides of walls, and hold cover securely in place.
- B. Do not apply uniform floor or roof loads for at least twelve (12) hours and concentrated loads for at least three (3) days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 2. Protect sills, ledges, and projections from mortar droppings.
 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

1.8 WARRANTY

- A. Warrant the Work specified herein for one (1) year against becoming unserviceable or causing an objectionable appearance resulting from either defective or nonconforming materials or workmanship. Defects shall include, but not be limited to, the following:
 1. Noticeable deterioration of unit or mortar finish.
 2. Chalking or dusting excessively.
 3. Changing color in irregular fashion.
 4. Cracking or spalling.
 5. Releasing from substrate.
 6. Staining or discoloring, including efflorescence.

PART 2 - PRODUCTS

2.1 BRICK UNITS

- A. facing Brick: ASTM C216, Type FBS Ruff, Grade SW.
 1. Basis of Design: Match existing adjacent units .
 2. Color and texture: Match existing adjacent units.
 3. Nominal Size: Match adjacent size..
 4. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
 5. Compressive Strength: As indicated on Drawings, measured in accordance with ASTM C67.

2.2 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.
- B. Hydrated Lime for Grout: ASTM C207, Type S.
- C. Hydrated Lime for Mortar: ASTM C207, Type N.
- D. Portland Cement-Lime Mix: Packaged blend of Portland cement and hydrated lime containing no other ingredients and meeting the requirements of ASTM C 270 proportion specification may be used.
 - 1. Holcim (US) Inc. Cement-Lime.
 - 2. Lafarge North America Inc. – Eaglebond Portland and Lime.
- E. Masonry Cement will not be allowed for use on this Project.
- F. Mortar Aggregate: ASTM C144.
- G. Grout Aggregate: ASTM C404.
- H. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
 - 1. Color(s): To be selected from manufacturers full range of colors.
- I. Water: Clean and potable.
- J. Accelerating Admixture: Non-chloride type for use in cold weather.

2.3 TIES AND ANCHORS

- A. General: Ties and anchors shall extend at least 1-1/2 inches (38 mm) into veneer but with at least a 5/8-inch (16-mm) cover on outside face.
- B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
 - 1. Mill-Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M, with ASTM A 641/A 641M, Class 1 coating.
 - 2. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M, with ASTM A 153/A 153M, Class B-2 coating.
 - 3. Stainless-Steel Wire: ASTM A 580/A 580M, Type 316.
 - 4. Galvanized-Steel Sheet: ASTM A 653/A 653M, Commercial Steel, G60 (Z180) zinc coating.
 - 5. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.
 - 6. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 316.
- C. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
 - 1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- (6.35-mm-) diameter, hot-dip galvanized steel wire. Mill-galvanized wire may be used at interior walls unless otherwise indicated.

2. Tie Section: Triangular-shaped wire tie made from 0.187-inch- (4.76-mm-) diameter, hot-dip galvanized steel wire. Mill-galvanized wire may be used at interior walls unless otherwise indicated.

D. Adjustable Masonry-Veneer Anchors:

1. General: Provide anchors that allow vertical adjustment but resist a 100-lbf (445-N) load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch (1.5 mm).
2. Fabricate sheet metal anchor sections and other sheet metal parts from 0.075-inch- (1.90-mm-) thick steel sheet, galvanized after fabrication.
3. Fabricate wire ties from 0.187-inch- (4.76-mm diameter, hot-dip galvanized-steel wire unless otherwise indicated.
4. Fabricate wire connector sections from 0.187-inch- (4.76-mm diameter, [hot-dip galvanized, carbon-steel wire.
5. Contractor's Option: Unless otherwise indicated, provide any of the adjustable masonry-veneer anchors specified.
6. Screw-Attached, Masonry-Veneer Anchors: Wire tie and a rib-stiffened, sheet metal anchor section with screw holes top and bottom, with a projecting vertical tab having a slotted hole for inserting wire tie.
7. Stainless-Steel Drill Screws for Steel Studs: ASTM C 954 except manufactured with hex washer head and neoprene or EPDM washer, No. 10 (4.83-mm) diameter by length required to penetrate steel stud flange with not less than three exposed threads; either made from Type 410 stainless steel or made with a carbon-steel drill point and 300 Series stainless-steel shank.

2.4 FLASHINGS

E. Metal Flashing: Provide metal flashing complying with Section 07 62 00 "Sheet Metal Flashing and Trim" and as follows:

1. Stainless Steel: ASTM A 240/A 240M or ASTM A 666, Type 304, 0.016 inch (0.40 mm) thick.
2. Fabricate continuous flashings in sections 96 inches (2400 mm) long minimum, but not exceeding 12 feet (3.7 m). Provide splice plates at joints of formed, smooth metal flashing.
3. Fabricate through-wall metal flashing embedded in masonry from stainless steel, with ribs at 3 inch (76 mm) intervals along length of flashing to provide an integral mortar bond.
4. Fabricate through-wall flashing with snaplock receiver on exterior face where indicated to receive counterflashing.
5. Fabricate through-wall flashing with drip edge unless otherwise indicated.
6. Fabricate metal expansion-joint strips from stainless steel to shapes indicated.
7. Solder metal items at corners.

F. Flexible Flashing: Use the following unless otherwise indicated:

- a. York Manufacturing, Inc.; Multi-Flash 500.
- b. STS Coatings, Inc.; Wall Guardian Copper TWF.
- c. Wire-Bond, Inc.; Copper Seal.
- d. Termination Bar: 1/8 inch thick by 1 inch minimum wide stainless-steel wit pre-punched holes.

G. Application: Unless otherwise indicated, use the following:

1. Where flashing is indicated to receive counterflashing, use metal flashing.
2. Where flashing is indicated to be turned down at or beyond the wall face, use metal flashing.
3. Where flashing is fully concealed, use flexible flashing.

- H. Solder and Sealants for Sheet Metal Flashings: As specified in Section 07 62 00 "Sheet Metal Flashing and Trim."
 - 1. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
 - 2. Elastomeric Sealant: ASTM C 920, chemically curing silicone sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and remain watertight.
 - 3. Lap Sealant: Butyl Tape as specified in section 07 92 00 "Joint Sealants"
- I. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

2.5 ACCESSORIES

- A. Preformed Control Joints: Neoprene material. Provide with corner and tee accessories, fused joints.
- B. Weeps/Cavity Vents: UV-resistant polypropylene copolymer, full height and width of head joint in color selected from manufacturer's standard range.
- C. Optional Weeps/Cavity Vents: Free-draining polyethylene mesh, full height and width of head joint in color selected from manufacturer's standard range.
- D. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
 - 1. Mortar Diverter: Panels installed at flashing locations.
 - a. Manufacturers:
 - 1) Advanced Building Products Inc.; Product Mortar Break-DT: www.advancedbuildingproducts.com
 - 2) Mortar Net USA, Ltd; Product Wall Defender: www.mortarnet.com.
 - 3) Hohmann & Barnard, Inc.; Product Mortar Trap: www.h-b.com.
- E. Cleaning Solution: Non-acidic, not harmful to masonry Work or adjacent materials.

2.6 MORTAR AND GROUT MIXES

- A. Mortar for Unit Masonry: ASTM C270, Proportion Specification.
 - 1. Exterior, non-loadbearing masonry; Type N.
- B. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.
 - 1. Use colored mortar on all exposed brick veneer.
- C. Grout: ASTM C476; consistency as required to fill volumes completely for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.
- D. Mixing: Use mechanical batch mixer and comply with referenced standards.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry Work.

3.2 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Brick Units:
 - 1. Bond: Running bond and soldier coursing as indicated in the Drawings.
 - 2. Coursing:
 - a. Vertical: Three (3) units and three (3) mortar joints to equal 8 inches.
 - b. Horizontal: One (1) unit and one (1) mortar joint equal to 8 inches.
 - 3. Mortar Joints: Concave.

3.3 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Grout cores solid beneath flashing where applicable.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar as work progresses.
- E. Interlock intersections and external corners, except for units laid in stack bond.
- F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- H. Isolate top joint of masonry veneer from horizontal structural framing members or support angles with compressible joint filler.

3.4 WEEPS/CAVITY VENTS

- A. Install weeps in veneer walls at 24 inches on center horizontally above through-wall flashing, above shelf angles and lintels, and at bottom of walls.
- B. Install cavity vents in veneer walls at 24 inches on center, minimum, horizontally at top of walls.

3.5 CAVITY MORTAR CONTROL

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. Install cavity mortar control panels continuously at the bottom of each cavity and above all through wall flashings. Extend vertically 12 inches. Install in exterior masonry cavities during construction of exterior wythe, complying with manufacturer's installation instructions. Verify that airspace width is no more than 3/8 inch greater than panel thickness. Install horizontally between joint reinforcement. Stagger end joints in adjacent rows. Fit to perimeter construction and penetrations without voids.

3.6 ANCHORED MASONRY VENEERS

- A. Anchor masonry veneers to wall framing with masonry-veneer anchors to comply with the following requirements:
 - 1. Fasten screw-attached anchors through sheathing to wall framing with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
 - 2. Embed tie sections in masonry joints.
 - 3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
 - 4. Space anchors as indicated, but not more than 18 inches (458 mm) o.c. vertically and 24 inches (610 mm) o.c. horizontally, with not less than one anchor for each 2 sq. ft. (0.2 sq. m) of wall area. Install additional anchors within 12 inches (305 mm) of openings and at intervals, not exceeding 8 inches (203 mm), around perimeter.
- b. Provide not less than 1 inch (25 mm) of airspace between back of masonry veneer and face of sheathing.
 - 1. Keep airspace clean of mortar droppings and other materials during construction. Bevel beds away from airspace, to minimize mortar protrusions into airspace. Do not attempt to trowel or remove mortar fins protruding into airspace.

3.7 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

- A. Anchor masonry to structural steel and concrete, where masonry abuts or faces structural steel or concrete to comply with the following:
 - 1. Provide an open space not less than 1/2 inch (13 mm) wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
 - 2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
 - 3. Space anchors as indicated, but not more than 24 inches (610 mm) o.c. vertically and 36 inches (915 mm) o.c. horizontally.

3.7 MASONRY FLASHINGS

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
 - 1. Extend flashings full width at such interruptions and at least 6 inches, minimum, into adjacent masonry or turn up at least 8 inches, minimum, to form watertight pan at non-masonry construction.
 - 2. Remove or cover protrusions or sharp edges that could puncture flashings.
 - 3. Seal lapped ends and penetrations of flashing before covering with mortar.

- B. Extend metal flashings to within 1/4 inch of exterior face of masonry.
- C. Extend laminated flashings to within 1/4 inch of exterior face of masonry.
 - 1. Ensure cores have been grouted solid beneath flashings.
- D. Lap end joints of flashings at least 6 inches, minimum, and seal watertight with flashing sealant/adhesive.
- E. Carry flashing upward across the cavity a minimum of 6 inches, unless noted otherwise and secure with termination bar.
 - 1. Minimum 10 inches at foundation wall.
- F. At heads and sills, flashing shall be turned up the sides to form a pan; corners shall be folded (not cut).

3.8 LINTELS

- A. Install loose steel lintels over openings.

3.9 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Locate expansion and control joints as shown on Drawings and as follows:
 - 1. On straight walls without openings, maximum 25 feet apart.
 - 2. Along the edge or jamb of openings.
 - a. Openings under 6 feet wide require joint on one (1) side of the opening.
 - b. Openings over 6 feet wide require joints on both sides of opening.
- C. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

3.10 TOLERANCES

- A. Dimensions and Locations of Elements:
 - 1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).
 - 2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
 - 3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) total.
- B. Lines and Levels:
 - 1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2 inch (12 mm) maximum.
 - 2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
 - 3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) maximum.
 - 4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.

5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2 inch (12 mm) maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch (1.5 mm).

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm).

3.11 CUTTING AND FITTING

- A. Cut and fit for pipes and conduit. Coordinate with other sections of Work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry Work not indicated or where appearance or strength of masonry Work may be impaired.

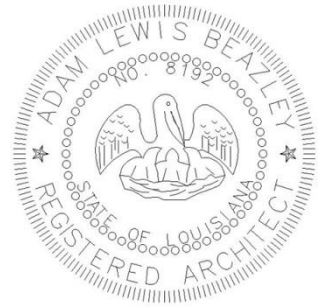
3.12 CLEANING

- A. Remove excess mortar and mortar smears as Work progresses.
- B. Replace defective mortar. Match adjacent Work.
- C. Clean soiled surfaces with cleaning solution.

3.13 PROTECTION

- A. Without damaging completed Work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION 04 20 01



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 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Steel supports for AVL equipment and rigging.
 - 2. Steel framing and supports for mechanical and electrical equipment.
 - 3. Steel framing and supports for applications where framing and supports are not specified in other Sections.
 - 4. Shelf angles.
 - 5. Metal bollards.
- B. Related Sections:
 - 1. Section 03 30 00 "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.

1.3 PERFORMANCE REQUIREMENTS

- A. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
 - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.4 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
 - 3. AWS D1.6, "Structural Welding Code - Stainless Steel."
- B. Finishing: At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 2 welds: Completely sanded joint, some undercutting and pinholes allowed.

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

1.6 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages and steel weld plates and angles for casting into concrete. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 FERROUS METALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Stainless-Steel Sheet, Strip, and Plate: ASTM A 240/A 240M or ASTM A 666, Type 304.
- C. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.
- D. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40) unless otherwise indicated.
- E. Perforated Metal Speaker Grilles, 1/8 inch thick perforated steel sheet with round holes and an open area in excess of 60 percent.

2.3 NONFERROUS METALS

- A. Aluminum Plate and Sheet: ASTM B 209 (ASTM B 209M), Alloy 6061-T6.
- B. Aluminium Extrusions : ASTM B 221 (ASTM B 221M), Alloy 6063-T6.

2.4 FASTENERS

- A. General: Unless otherwise indicated, provide Type 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

1. Provide stainless-steel fasteners for fastening aluminum.
 2. Provide stainless-steel fasteners for fastening stainless steel.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.
- C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593 (ASTM F 738M); with hex nuts, ASTM F 594 (ASTM F 836M); and, where indicated, flat washers; Alloy Group (1) A1.
- D. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.
1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- E. Machine Screws: ASME B18.6.3 (ASME B18.6.7M).
- F. Lag Screws: ASME B18.2.1 (ASME B18.2.3.8M).
- G. Wood Screws: Flat head, ASME B18.6.1.
- H. Plain Washers: Round, ASME B18.22.1 (ASME B18.22M).
- I. Lock Washers: Helical, spring type, ASME B18.21.1 (ASME B18.21.2M).
- J. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six (6) times the load imposed when installed in unit masonry and four (4) times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
- K. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
- L. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.
 2. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group (2) A4 stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).
- 2.5 MISCELLANEOUS MATERIALS
- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Shop Primers: Provide primers that comply with Section 09 91 13 "Exterior Painting."

- C. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 - 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- D. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- F. Non-shrink, Metallic Grout: Factory-packaged, ferrous-aggregate grout complying with ASTM C 1107, specifically recommended by manufacturer for heavy-duty loading applications.

2.6 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing Work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. 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 to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 2 welds: Completely sanded joint, some undercutting and pinholes allowed.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
 - 1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6 inch

embedment and 2 inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.7 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
 - 1. Furnish inserts for units installed after concrete is placed.
- C. Galvanize miscellaneous framing and supports where indicated.
 - 1. All members exposed to weather shall be galvanized.

2.8 SHELF ANGLES

- A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4 inch bolts, spaced not more than 6 inches from ends and 24 inches o.c., unless otherwise indicated.
 - 1. Provide mitered and welded units at corners.
 - 2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches larger than expansion or control joint.
- B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.
- C. Galvanize shelf angles located in exterior walls.
- D. Prime shelf angles located in exterior walls with zinc-rich primer.
- E. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

2.9 METAL BOLLARDS

- A. Fabricate metal bollards from Schedule 40 steel pipe.
 - 1. Where bollards are indicated to receive controls for door operators, provide necessary cutouts for controls and holes for wire.
- B. Prime Bollards with primer specified in Section 09 91 13 - "Exterior Painting".

2.10 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

- B. Galvanize plates.
- C. Prime loose bearing and leveling plates with primer specified in Section 099113 - "Exterior Painting".

2.11 LOOSE STEEL LINTELS

- A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.
- B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span but not less than 8 inches unless otherwise indicated.
- C. Galvanize loose steel lintels located in exterior walls.
- D. Prime loose bearing and leveling plates with primer specified in Section 09 91 13 - "Exterior Painting"

2.12 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two (2) integrally welded steel strap anchors for embedding in concrete.

2.13 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish metal fabrications after assembly.
- C. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.14 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.
 - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
 - 1. Shop prime with universal shop primer unless otherwise indicated.
- C. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:

1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 2. Other Items: SSPC-SP 3, "Power Tool Cleaning."
- D. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.15 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. As-Fabricated Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).
- C. Smooth Specular Finish: AA-M22.
- D. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: non-specular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

- F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:

- 1. Extruded Aluminum: Two (2) coats of clear lacquer.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports for operable partitions securely to and rigidly brace from building structure.

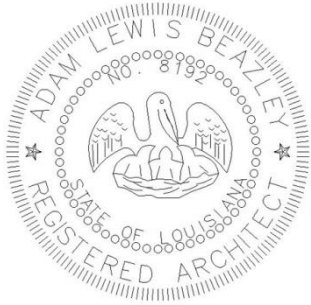
3.3 INSTALLING METAL BOLLARDS

- A. Fill metal-capped bollards solidly with concrete and allow concrete to cure seven (7) days before installing.
 - 1. Do not fill removable bollards with concrete.
- B. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.
- C. Fill bollards solidly with concrete, mounding top surface to shed water.
 - 1. Do not fill removable bollards with concrete.

3.4 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum 2.0 mil (0.05 mm) dry film thickness.
- B. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 09 91 13 "Exterior Painting".
- C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 05 50 00



SECTION 05 52 13 - PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Wall mounted handrails.

1.2 RELATED REQUIREMENTS

- A. Section 09 91 23 – “Interior Painting and Finishing”.

1.3 REFERENCE STANDARDS

- A. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2013.
- B. ASTM E985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings; 2000 (Reapproved 2006).

1.4 SUBMITTALS

- A. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.

PART 2 - PRODUCTS

2.1 RAILINGS - GENERAL REQUIREMENTS

- A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of ASTM E985 and applicable local code.
- B. Distributed Loads: Design railing assembly, wall rails, and attachments to resist distributed force of 75 pounds per linear foot applied to the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E 935.
- C. Concentrated Loads: Design railing assembly, wall rails, and attachments to resist a concentrated force of 200 pounds applied at any point on the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E 935.
- D. Allow for expansion and contraction of members and building movement without damage to connections or members.
- E. Dimensions: See Drawings for configurations and heights.
 - 1. Interior Railings:

- a. Rails: 1-1/2 inches diameter, round.
 - b. Posts: 1-1/2 inches diameter, round.
- F. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
 - 1. Wall brackets shall provide 2-1/4 inch clearance between wall and handrail.
- G. Provide slip-on non-weld mechanical fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

2.2 FABRICATION

- A. Accurately form components to suit specific Project conditions and for proper connection to building structure.
- B. Fit and shop assemble components in largest practical sizes for delivery to site.
- C. Fabricate components with joints tightly fitted and secured.
- D. Welded Joints:
 - 1. Exterior Components: Continuously seal joined pieces by continuous welds. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
 - 2. Interior Components: Continuously seal joined pieces by continuous welds.
 - 3. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
 - a. Standard – NOMMA, Guideline 1: Joint finishes – Type 2.
- E. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.

2.3 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

2.4 STEEL AND IRON FINISHES

- A. Galvanized Railings:
 - 1. Hot-dip galvanize steel and iron railings, including hardware, after fabrication.
 - 2. Comply with ASTM A 123/A 123M for hot-dip galvanized railings.
 - 3. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
 - 4. Fill vent and drain holes that will be exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.

- B. For galvanized railings, provide hot-dip galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.
- C. Preparing Galvanized Railings for Shop Priming: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.
- D. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.
 - 1. Color: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive Work.

3.2 PREPARATION

- A. Supply items required to be cast into concrete with setting templates, for installation as Work of other sections.

3.3 INSTALLATION

- A. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.
- B. Anchor railings securely to structure.
- C. Conceal anchor bolts and screws whenever possible.
- D. Paint all rails in public areas, at exterior locations, and along the catwalks as specified in Section 09 91 13 "Exterior Painting" and Section 01 91 23 "Interior Painting".

3.4 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per floor level, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

3.5 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 the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0 mil (0.05 mm) dry film thickness.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

3.6 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

END OF SECTION 05 52 13



SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Special Conditions, Information for Bidders, and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Carpentry work not specified as part of other sections and which generally is not exposed, except as otherwise indicated.
 - 2. Rough carpentry for:
 - a. Miscellaneous lumber for attachment and support of other work.
 - b. Wood blocking, cants, and nailers.
 - c. Wood furring.
 - d. Plywood backing panels.
 - 3. Preservative treatment.
 - 4. Fire retardant treatment.
- B. Related Requirements:
 - 1. Finish carpentry: Elsewhere in Division 6.

1.3 DEFINITIONS

- A. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) or greater but less than 5 inches nominal (114 mm actual) in least dimension.
- B. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. SPIB: The Southern Pine Inspection Bureau.
- C. Boards or Strips: Lumber of less than 2 inches nominal in least dimension.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
 - 3. Provide dressed lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWP A U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground and Use Category UC4a for items in contact with the ground.
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Wood sills, sleepers, blocking, furring and similar concealed members in contact with masonry or concrete.
 - 3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction and with fire-

test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional twenty (20) minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.
 - 1. Use treatment that does not promote corrosion of metal fasteners.
 - 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
 - 3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
 - 4. Design Value Adjustment Factors: Treated lumber shall be tested according ASTM D 5664 and design value adjustment factors shall be calculated according to ASTM D 6841.
- C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
 - 1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by testing agency.
- E. Application: Treat items indicated on Drawings, and the following:
 - 1. Concealed blocking.

2.4 DIMENSIONAL LUMBER FRAMING

- A. Non Load-Bearing Interior Partitions: No 2 grade.
 - 1. Application: Interior non-load-bearing.
 - 2. Species: Southern Pine or mixed Southern Pine.

2.5 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
 - 2. Nailers.
 - 3. Cants.
 - 4. Furring.
- B. For concealed boards, provide lumber with 19 percent maximum moisture content and the following species and grades:

1. Mixed Southern Pine; No. 2 grade; SPIB.

- C. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- E. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.6 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: DOC PS 1, Exterior, AC, in thickness indicated or, if not indicated, not less than 3/4 inch (19 mm) nominal thickness.

2.7 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 - 1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: NES NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).
- F. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.
- G. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six (6) times the load imposed when installed in unit masonry assemblies and equal to four (4) times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
 - 1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
 - 2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Grade A1 or A4).

2.8 MISCELLANEOUS MATERIALS

- A. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum

foil, or spun-bonded polyolefin to produce an overall thickness of not less than 0.025 inch (0.6 mm).

- B. Adhesives for Gluing Furring to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds and similar supports to comply with requirements for attaching other construction.
- B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- C. Install plywood backing panels by fastening to studs or masonry walls; coordinate locations with utilities requiring backing panels. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.
- D. Do not splice structural members between supports unless otherwise indicated.
- E. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items and trim.
 - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.
- F. Provide fire blocking in furred spaces, stud spaces and other concealed cavities as indicated and as follows:
 - 1. Fire block furred spaces of walls, at each floor level, at ceiling and at not more than 96 inches o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
 - 2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2 inch nominal thickness.
 - 3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. and to solidly fill space below partitions.
- G. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- H. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.
 2. Use copper naphthenate for items not continuously protected from liquid water.
- I. Securely attach rough carpentry Work to substrate by anchoring and fastening as indicated, complying with the following:
1. NES NER-272 for power-driven fasteners.
 2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
 3. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One (1) and Two (2) Family Dwellings.
- J. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

3.2 WOOD GROUND, BLOCKING, AND NAILER INSTALLATION

- A. Install where indicated and where required for attaching other Work. Form to shapes indicated and cut as required for true line and level of attached Work. Coordinate locations with other Work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.
- C. Where wood-preserved-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

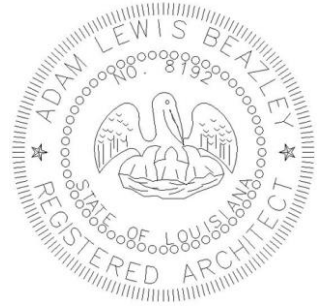
3.3 WOOD FURRING INSTALLATION

- A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish Work.
- B. Furring to Receive Gypsum Board: Install 1 by 2 inch nominal (19 by 38 mm actual) size furring vertically at 16 inches (406 mm) o.c.

3.4 PROTECTION

- A. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes sufficiently wet that moisture content exceeds that specified, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06 10 00



SECTION 06 20 23 - INTERIOR FINISH CARPENTRY

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. Interior trim.
 - 2. Wood slats.
- B. Related Requirements:
 - 1. Section 06 10 00 "Rough Carpentry" for furring, blocking, and rough sawn butt-lap siding.
 - 2. Section 06 20 23 "Plastic-Laminate-Faced Architectural Cabinets" for shop-fabricated interior woodwork.
 - 3. Section 09 91 23 "Interior Painting and Finishing" for priming and backpriming of interior finish carpentry.

1.3 DEFINITIONS

- A. MDF: Medium-density fiberboard.
- B. MDO: Plywood with a medium-density overlay on the face.

1.4 ACTION SUBMITTALS

- A. Samples for Verification:
 - 1. For each species and cut of lumber and panel products with non-factory-applied finish, with 1/2 of exposed surface finished, 50 sq. in. for lumber and 8 by 10 inches for panels.
 - 2. For each finish system and color of lumber and panel products with factory-applied finish, 50 sq. in. for lumber and 8 by 10 inches for panels.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation. Protect materials from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.
- B. Deliver interior finish carpentry materials only when environmental conditions meet requirements specified for installation areas. If interior finish carpentry materials must be stored

in other than installation areas, store only where environmental conditions meet requirements specified for installation areas.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.
 - 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Lumber: DOC PS 20 and the following grading rules:
 - 1. NeLMA: Northeastern Lumber Manufacturers' Association, "Standard Grading Rules for Northeastern Lumber."
 - 2. NHLA: National Hardwood Lumber Association, "Rules for the Measurement and Inspection of Hardwood & Cypress."
 - 3. NLGA: National Lumber Grades Authority, "Standard Grading Rules for Canadian Lumber."
 - 4. SPIB: The Southern Pine Inspection Bureau, "Standard Grading Rules for Southern Pine Lumber."
 - 5. WCLIB: West Coast Lumber Inspection Bureau, Standard No. 17, "Grading Rules for West Coast Lumber."
 - 6. WWPAA: Western Wood Products Association, "Western Lumber Grading Rules."
- B. Factory mark each piece of lumber with grade stamp of inspection agency indicating grade, species, moisture content at time of surfacing, and mill.
 - 1. For exposed lumber, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by inspection agency.

2.2 INTERIOR TRIM

- A. Smooth, transparent finished wood for use on interior wood surfaces:
 - 1. Wood base
 - 2. Trim caps.
- B. Hardwood Lumber for Transparent Finish (Stain or Clear Finish):
 - 1. Species and Grade: Red Oak.

2. Maximum Moisture Content: 13 percent.
3. Finger Jointing: Not allowed.
4. Gluing for Width: Not allowed.
5. Veneered Material: Not allowed.
6. Face Surface: Surfaced (smooth).
7. Matching: Selected for compatible grain and color.
8. Cut: Plain sawn.
9. Size: As indicated in drawings
10. Finish: As indicated in drawings

2.3 WOOD SLATS

- A. Smooth, transparent finished wood for use on interior wood surfaces:

1. Wood Slats.

- B. Hardwood Lumber for Transparent Finish (Stain or Clear Finish):

1. Species and Grade: Red oak.
2. Maximum Moisture Content: 13 percent.
3. Finger Jointing: Not allowed.
4. Gluing for Width: Not allowed.
5. Veneered Material: Not allowed.
6. Face Surface: Surfaced (smooth).
7. Matching: Selected for compatible grain and color.
8. Cut: Plain sawn.
9. Size: As indicated in drawings
10. Finish: As indicated in drawings

2.4 MISCELLANEOUS MATERIALS

- A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material and finish required for application indicated to provide secure attachment, concealed where possible.
- B. Multipurpose Construction Adhesive: Formulation complying with ASTM D 3498 that is recommended for indicated use by adhesive manufacturer.

2.5 FABRICATION

- A. Back out or kerf backs of the following members except those with ends exposed in finished work:
1. Interior standing and running trim.
 2. Base boards
- B. Ease edges of lumber to 1/16 inch radius.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Install wood blocking specified elsewhere as a substrate for the installation of interior finish carpentry.
- B. Clean substrates of projections and substances detrimental to application.
- C. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of twenty-four (24) hours.

3.3 INSTALLATION, GENERAL

- A. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, too small to fabricate with proper jointing arrangements, or with defective surfaces, sizes, or patterns.
- B. Install interior finish carpentry level, plumb, true and aligned with adjacent materials. Use concealed shims where necessary for alignment.
 - 1. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
 - 2. Where face fastening is unavoidable, countersink fasteners, fill surface flush and sand unless otherwise indicated.
 - 3. Install to tolerance of 1/8 inch in 96 inches for level and plumb. Install adjoining interior finish carpentry with 1/32 inch (0.8 mm) maximum offset for flush installation and 1/16 inch maximum offset for reveal installation.
 - 4. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

3.4 STANDING AND RUNNING TRIM INSTALLATION

- A. Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches long, except where necessary. Stagger joints in adjacent and related standing and running trim. Miter at returns, miter at outside corners and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints for end-to-end joints. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.

1. Install trim after gypsum-board joint finishing operations are completed.
2. Install without splitting; drill pilot holes before fastening where necessary to prevent splitting. Fasten to prevent movement or warping. Countersink fastener heads on exposed carpentry work and fill holes.

3.5 ADJUSTING

- A. Replace interior finish carpentry that is damaged or does not comply with requirements. Interior finish carpentry may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

3.6 CLEANING

- A. Clean interior finish carpentry on exposed and semi-exposed surfaces. Restore damaged or soiled areas and touch up factory-applied finishes, if any.

3.7 PROTECTION

- A. Protect installed products from damage from weather and other causes during construction.
- B. Remove and replace finish carpentry materials that are wet, moisture damaged and mold damaged.
 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 06 20 23

SECTION 06 41 13 –WOOD-VENEER-FACED
ARCHITECTURAL CABINETS



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. Slab wood architectural cabinets.
- B. Related Requirements:
 - 1. Section 06 10 00 "Rough Carpentry" for applied wood siding, wood furring, blocking, shims, and hanging strips required for installing cabinets and concealed within other construction before cabinet installation.
 - 2. Section 12 36 61 "Quartz Countertops" for installation of quartz countertops.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product, including panel products high-pressure decorative laminate and cabinet hardware and accessories.
- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
 - 1. Show details full size.
 - 2. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
 - 3. Show locations and sizes of cutouts and holes for electrical switches and outlets and other items installed in architectural plastic-laminate cabinets.
 - 4. Apply WI Certified Compliance Program label to Shop Drawings.
- C. Samples for Verification:
 - 1. Lumber Products with Shop-Applied Opaque Finish: 5 inches wide by 12 inches long for lumber and 8 by 10 inches for panels, for each finish system and color.
 - 2. Exposed cabinet hardware and accessories, one (1) unit for each type and finish.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver cabinets until painting and similar operations that could damage woodwork have been completed in installation areas. If cabinets must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - 1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed, and indicate measurements on Shop Drawings.
- C. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.7 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that cabinets can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 CABINETS, GENERAL

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of slab wood architectural cabinets indicated for construction, finishes, installation, and other requirements.
 - 1. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with those selections and requirements in addition to the quality standard.

2.2 WOOD CABINETS FOR OPAQUE FINISH

- A. Grade: Premium.

- B. Type of Construction: Face frame.
- C. Door and Drawer-Front Style: Flush overlay.
 - 1. Retain "Reveal Dimension" Subparagraph below for reveal-overlay style doors and drawer fronts.
 - 2. Reveal Dimension: 1/8 inch.
- D. "Species for Exposed Lumber Surfaces" and "Panel Product for Exposed Surfaces" paragraphs below are examples of requirements that are more restrictive than AWS. If required, retain these paragraphs and revise them to suit Project.
- E. Species for Exposed Lumber Surfaces: Any closed-grain hardwood.
- F. Panel Product for Exposed Surfaces: MDF.
- G. Retain "Semiexposed Surfaces" Paragraph below to restrict woodworker's choices established by AWS.
- H. Semiexposed Surfaces:
 - 1. Surfaces Other Than Drawer Bodies: Match materials indicated for exposed surfaces.
 - 2. Drawer Sides and Backs: Solid-hardwood lumber.
 - 3. Drawer Bottoms: Hardwood plywood.
- I. Retain "Dust Panels" Paragraph below if required. Dust panels are not required by AWS.
- J. Dust Panels: 1/4-inch plywood or tempered hardboard above compartments and drawers unless located directly under tops.
- K. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
 - 1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners or glued dovetail joints.

2.3 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.
 - 1. Wood Moisture Content: 8 to 13 percent.
 - 2. Do not use plain-sawn softwood lumber with exposed, flat surfaces more than 3 inches wide.
- B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.

2.4 FIRE-RETARDANT-TREATED MATERIALS

- A. Fire-Retardant-Treated Materials, General: Where fire-retardant-treated materials are indicated, use materials that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
 - 1. Use treated materials that comply with requirements of referenced quality standard. Do not use materials that are warped, discolored, or otherwise defective.
 - 2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
 - 3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.
- B. Fire-Retardant-Treated Lumber and Plywood: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
 - 1. Kiln-dry lumber and plywood after treatment to a maximum moisture content of 19 and 15 percent, respectively.
 - 2. Retain first subparagraph below if items are to receive a stained or natural finish. Organic resin treatment is more expensive than salt treatments but helps ensure a better stained or natural finish.
 - 3. For items indicated to receive a stained or natural finish, use organic resin chemical formulation.
 - 4. Retain one of two subparagraphs below. Before retaining first, verify that wood species and treatment process specified are approved for milling after treatment.
 - 5. Mill lumber after treatment within limits set for wood removal that do not affect listed fire-test-response characteristics, using a woodworking shop certified by testing and inspecting agency.
 - 6. Mill lumber before treatment and implement procedures during treatment and drying processes that prevent lumber from warping and developing discolorations from drying sticks or other causes, marring, and other defects affecting appearance of architectural cabinets.
- C. Fire-Retardant Particleboard: Made from softwood particles and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 25 or less per ASTM E 84.
- D. Fire-Retardant Fiberboard: MDF panels complying with ANSI A208.2, made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 200 or less per ASTM E 84.

2.5 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets except for items specified in Section 08 71 11 "Door Hardware."

- B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 135 degrees of opening, self-closing.
- C. Pulls: Arched or straight linear bar style with extended overhangs, 5 1/2 inch minimum centers by 5/16 inch minimum diameter, no escutcheons.
 - 1. Finish: 26 D satin nickel.
- D. Shelf Rests: BHMA A156.9, B04013; plastic.
- E. Drawer Slides: BHMA A156.9.
 - 1. Grade 1HD-100 and Grade 1HD-200: Side mounted; full-overtravel-extension type; zinc-plated-steel ball-bearing slides.
 - 2. For drawers more than 3 inches (75 mm) high but not more than 6 inches (150 mm) high and not more than 24 inches (600 mm) wide, provide Grade 1HD-100.
 - 3. For drawers more than 6 inches (150 mm) high or more than 24 inches (600 mm) wide, provide Grade 1HD-200.
- F. Door Locks: BHMA A156.11, E07121, where indicated.
- G. Drawer Locks: BHMA A156.11, E07041, where indicated.
- H. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.6 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

2.7 FABRICATION

- A. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.
- B. Fabricate architectural cabinets to dimensions, profiles, and details indicated. Ease edges and corners to 1/16-inch radius unless otherwise indicated.
- C. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
 - 1. Retain first subparagraph below if Architect will examine work in woodwork shop before it is shipped to Project site.
 - 2. Notify Architect seven days in advance of the dates and times architectural cabinet fabrication will be complete.

3. Retain subparagraph below for high-quality and large or complex work.
 4. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.
- D. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

2.8 SHOP FINISHING

- A. General: Finish architectural cabinets at fabrication shop as specified in this Section. Defer only final touchup, cleaning, and polishing until after installation.
- B. Shop Priming: Shop apply the prime coat including backpriming, if any, for items specified to be field finished. See Section 09 91 23 "Interior Painting and Finishing" for material and application requirements.
- C. Preparation for Finishing: Comply with referenced quality standard for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing architectural cabinets, as applicable to each unit of work.
1. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of cabinets.
- D. Opaque Finish:
1. Grade: Premium.
 2. Review AWS for general performance characteristics of finishing systems. In general, System - 5 is a durable, repairable, and good general-purpose fine finish; System - 7 is durable and has good chemical resistance; System - 11 is very durable but not easily repaired; and System - 13 can have high gloss (wet look), requires special care in applying, and is not generally repairable.
 3. Finish: System - S-W ProMar 200 Alkyd Semi-Gloss, B34W200 Series
 4. Color: To Be Selected.
 5. Sheen: To Be selected.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition cabinets to average prevailing humidity conditions in installation areas for not less than 72 hours.
- B. Before installing cabinets, examine shop-fabricated work for completion and complete work as required.

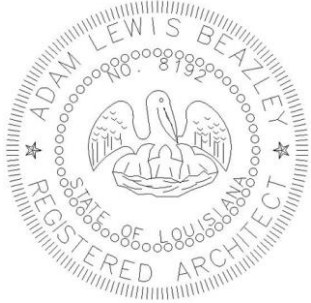
3.2 INSTALLATION

- A. Grade: Install cabinets to comply with same grade as item to be installed.
- B. Assemble cabinets and complete fabrication at Project site to the extent that it was not completed in the shop.
- C. Install cabinets level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.
- D. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.
 - 1. Use filler matching finish of items being installed.
- F. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
 - 1. Install cabinets with no more than 1/8 inch in 96 inch sag, bow, or other variation from a straight line.
 - 2. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c. with No. 10 wafer-head screws sized for not less than 1-1/2 inch penetration into wood framing, blocking, or hanging strips or No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish.
- G. Shop Finishes: Touch up finishing after installation of architectural cabinets. Fill nail holes with matching filler.
 - 1. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats are shop applied.
- H. Field Finishing: See Section 09 91 23 "Interior Painting and Finishing" for finishing of installed architectural cabinets.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean cabinets on exposed and semi-exposed surfaces. Touch up finishes to restore damaged or soiled areas.

END OF SECTION 06 41 13



SECTION 07 21 00 - THERMAL INSULATION

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. Glass-fiber blanket insulation.
- B. Related Sections:
 - 1. Section 06 10 00 "Rough Carpentry" for rigid insulation in wall cavities.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1.4 QUALITY ASSURANCE

- A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.1 GLASS-FIBER BLANKET INSULATION

- A. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. CertainTeed Corporation: CertaPro Commercial: 6 inch thickness, R-19.
 - b. Owens Corning: EcoTouch: 6 inch thickness, R-19.
2. Total R-Value: 19.6 inch thick.
3. Sustainability Requirements: Provide glass-fiber blanket insulation as follows:
 - a. Free of Formaldehyde: Insulation manufactured with 100 percent acrylic binders and no formaldehyde.
 - b. Low Emitting: Insulation tested according to ASTM D 5116 and shown to emit less than 0.05 ppm formaldehyde.
4. Location: Exterior walls.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of substances that are harmful to insulation or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.3 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

3.4 PACKAGING AND TRANSPORTATION

- A. Material handling, and the flow of materials from manufacturing site to job site is a significant part of the construction process. Precautions taken when storing insulation

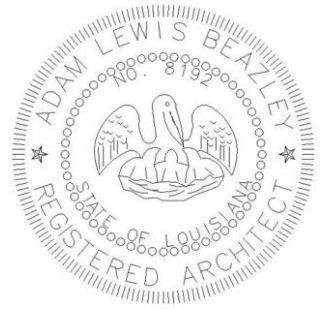
products on the jobsite can help minimize the potential for damage. Keep product tarped or covered to protect from weather. Do not use clear plastic covering film. If possible, store indoors. Care should be taken to keep exposed foam protected from reflective sunlight or prolonged solar exposure.

3.5 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 07 21 00

SECTION 07 21 29 - SPRAYED INSULATION



PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Acoustic cellulose insulation applied to underside of structure.

1.2 REFERENCE STANDARDS

- A. ASTM C739 - Standard Specification for Cellulosic Fiber (Wood-Base) Loose-Fill Thermal Insulation; 2011.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- C. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 2012.

1.3 SUBMITTALS

- A. Product Data: Provide data on materials, describing insulation properties.
- B. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and requirements for tamping.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the Work of this section with minimum three (3) years of experience.

1.5 MOCK-UP

- A. Provide in-situ mock-up, 10 feet long by 10 feet wide, illustrating representative finish sample.
- B. Locate where directed.
- C. Mock-up may remain as part of the Work.

1.6 FIELD CONDITIONS

- A. Maintain acceptable ambient and substrate surface temperatures prior to, during, and after installation of primer and insulation materials and overcoat.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Cellulose Fiber:

1. GreenFiber: www.greenfiber.com.
2. International Cellulose Corporation: www.spray-on.com.
3. ThermoCon, Inc.: www.thermocon.com.

2.2 MATERIALS

A. Cellulose Fiber Insulation: ASTM C739; treated cellulose fiber.

1. Basis-of-Design Product: Subject to compliance with the requirements provide International Corporation; K-13 Spray-On-System or a comparable system by an approved manufacturer.
2. Material to have been tested in accordance with ASTM E 1042.
3. NRC: 0.75 for 1 inch thickness.
4. NRC: Minimum 1.00 for 3 inch thickness.
5. R-Value: 3.7 per inch in accordance with ASTM C 518.
6. Bond Strength: Minimum 100 psf in accordance with ASTM E 736.
7. Flame Spread and Smoke Developed Index: 10/0, when tested in accordance with ASTM E84.
8. Combustibility: Passing ASTM E136.
9. Color: Black.

2.3 ACCESSORIES

A. Primer: As required by insulation manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are clean, dry, and free of matter that may inhibit adhesion.
- B. Verify that ceiling hangers and supporting clips have been installed correctly.
- C. Verify other Work on and within spaces to be insulated is complete prior to application.

3.2 PREPARATION

- A. Mask and protect adjacent surfaces from overspray or damage.
- B. Apply primer in accordance with manufacturer's instructions.

3.3 INSTALLATION

- A. Install insulation in accordance with manufacturer's instructions.

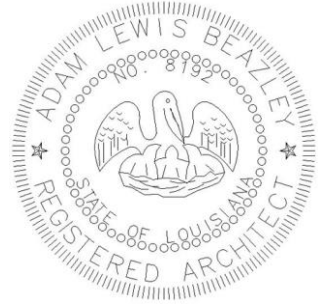
- B. Install insulation to a uniform monolithic density without voids.
- C. Install to a minimum cured thickness of 3 inch or thicker if indicated in the Drawings or required to get sound ratings.
- D. Tamp wet insulation surface to improve adhesion and to achieve a smooth surface.

3.4 PROTECTION

- A. Do not permit subsequent construction work to disturb applied insulation.

END OF SECTION 07 21 29

SECTION 07 27 26 - FLUID-APPLIED MEMBRANE
AIR BARRIERS



PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Special Conditions, Information for Bidders and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes fluid-applied, vapor-permeable membrane air barriers over vertical above grade concrete walls, concrete masonry walls and wall sheathing.
- B. Related Requirements:
 - 1. Section 06 16 00 "Sheathing".
 - 2. Section 07 62 00 "Sheet Metal Flashing and Trim".

1.3 DEFINITIONS

- A. Air-Barrier Material: A primary element that provides a continuous barrier to the movement of air.
- B. Air-Barrier Accessory: A transitional component of the air barrier that provides continuity.
- C. Air-Barrier Assembly: The collection of air-barrier materials and accessory materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include manufacturer's written instructions for evaluating, preparing and treating substrate; technical data; and tested physical and performance properties of products.
- B. Shop Drawings: For air-barrier assemblies.
 - 1. Show locations and extent of air barrier. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations and tie-ins with adjoining construction.
 - 2. Include details of interfaces with other materials that form part of air barrier.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, include list of ABAA-certified installers and supervisors employed by the Installer, who work on Project.

- B. Product Certificates: From air-barrier manufacturer, certifying compatibility of air barriers and accessory materials with Project materials that connect to or that come in contact with the barrier.
- C. Product Test Reports: For each air-barrier assembly, for tests performed by a qualified testing agency.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Installer shall be trained and approved by manufacturer.
 - 2. Installer shall be skilled, experienced and knowledgeable in waterproofing and air barrier application and familiar with the requirements of the specified Work.
 - 3. Installer shall provide the proper equipment, manpower and supervision on the job-site to install the air barrier assembly in compliance with the Project plans and specifications, Shop Drawings and manufacturers published specifications and details.
- B. Regulatory Compliance:
 - 1. Primary air barrier and joint treatment reinforcement materials:
 - a. Listed by IBC and recognized for use on all types of construction.
 - b. Listed by CCMC and recognized for use on all types of construction.
 - c. Comply with VOC requirements of SCAQMD Rule 1113.
 - d. Comply with ASHRAE 90.1 – 2010.
 - e. Comply with ASHRAE 189.1 – 2009.
- C. Mockups: Build mockups to set quality standards for materials and execution.
 - 1. Build integrated mockups of exterior wall assembly, (150 sq. ft.) 14 sq. m, incorporating backup wall construction, external cladding, window, storefront, door frame and sill, insulation, ties and other penetrations and flashing to demonstrate surface preparation, crack and joint treatment, application of air barriers and sealing of gaps, terminations and penetrations of air-barrier assembly.
 - a. Coordinate construction of mockups to permit inspection by Owner's testing agency of air barrier before external insulation and cladding are installed.
 - b. Include junction with roofing membrane, building corner condition and foundation wall intersection.
 - c. If Architect determines mockups do not comply with requirements, reconstruct mockups and apply air barrier until mockups are approved.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Contactor specifically requests such deviations in writing to the Architect and the Architect approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Owner will engage a qualified testing agency to perform preconstruction testing on field mockups.

1. Notify design professional minimum seven (7) days prior to testing.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Remove and replace liquid materials that cannot be applied within their stated shelf life.
- B. Protect stored materials from direct sunlight.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended by air-barrier manufacturer.
 1. Protect substrates from environmental conditions that affect air-barrier performance.
 2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog or mist.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Source Limitations: Obtain primary air-barrier materials and air-barrier accessories from single source from single manufacturer.
- B. Manufacturer: Basis of Design: Sto Corporation.
 1. Primary Air Barrier Material: StoGuard VaporSeal, ready-mixed flexible spray or roller applied air and moisture barrier membrane material.
 2. Other manufacturers may submit for prior approval per Section 01 60 00 "Product Requirements".
- C. VOC Content: 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and complying with VOC content limits of authorities having jurisdiction.

2.2 PERFORMANCE REQUIREMENTS

- A. General: Air barrier shall be capable of performing as a continuous vapor barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to installed waterproofing and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.
- B. Low Temperature Crack Bridging: ASTM C1305, no cracking after 10 cycles at -15°F (-26°C)
- C. Elongation: ASTM D412, primary air barrier and vapor barrier material, > 500 percent.
- D. Tensile Strength: ASTM D412, > 200 psi (1378 kPa).
- E. Nail Sealability: ASTM D1970, primary air barrier and vapor barrier passes.

- F. Resistance to Mold Growth: ASTM D3273, no growth at ninety (90) days.
- G. Adhesion: Joint treatment and primary air barrier and vapor barrier material, ASTM D 4541, > 15 psi (103 kPa) over glass mat gypsum sheathing, > 50 psi (344 kPa) over concrete, OSB and plywood substrates.
- H. Field Adhesion Testing: ASTM D4541, > 15 psi (103 kPa) or exceeds strength of glass mat facing on glass mat gypsum substrates.
- I. Water Vapor Permeance: ASTM E96 Method A, < 0.1 perms (5.7 ng/Pa·s·m²).
- J. Building Envelope Air Leakage: ASTM E 779 or 1827, < 0.4 cfm/ft² (2 L/s·m²).
- K. Air Leakage: ASTM E2178, primary air barrier and vapor barrier and joint treatment < 0.004 cfm/ft² at 1.57 psf (0.02 L/s·m² at 75 Pa).
- L. Air Leakage of Assembly: ASTM E2357, < 0.04 cfm/ft² (0.2 L/s·m²) air leakage after conditioning protocol.
- M. Flame Propagation: NFPA 285, evaluated as part of an NFPA 285 tested assembly to qualify for use on Types I-IV construction.
- N. Volatile Organic Compounds: SCAQMD Rule 1113, joint treatment and primary air barrier and vapor barrier material < 100 g/L.

2.3 ACCESSORY MATERIALS

- A. General: Accessory materials recommended by air-barrier manufacturer to produce a complete air-barrier assembly and compatible with primary air-barrier material.
- B. Rough Opening Treatments:
 - 1. StoGuard VaporSeal with StoGuard Fabric and StoGuard Redicorner™: flexible waterproof air barrier membrane material with non-woven integrally reinforced cloth reinforcements. Also used as a detail component for shingle lap transition at flashing.
- C. Joint Reinforcements:
 - 1. StoGuard VaporSeal with StoGuard Fabric: Flexible air and moisture barrier membrane material for embedding non-woven integrally reinforced cloth reinforcement.
- D. Transition Detail Components:
 - 1. StoGuard Transition Membrane: Flexible air barrier membrane for continuity at static transitions: sheathing to foundation, dissimilar materials (CMU to frame wall), wall to balcony floor slab or ceiling and shingle lap transitions to flashing. Also used for dynamic joints: floor line deflection joints, masonry control joints and through wall joints in masonry or frame construction.
 - 2. Sto RapidGuard: One (1) component STPE rapid drying gun-applied treatment for sheathing joints, rough openings, seams, cracks, penetrations and other static transitions in above grade wall construction such as: shingle lap transition to flashing, wall to balcony floor slab or ceiling, and through wall penetrations, pipes, electrical boxes and scupper penetrations.

3. StoGuard RapidFill: One (1) component gun-applied air and moisture barrier membrane material for continuity at static transitions such as: flashing shingle laps, wall to balcony floor slab or ceiling and through wall penetrations such as pipes, electrical boxes and scupper penetrations.
- E. Acrylic High Performance Coating:
1. StoCoat Acryl Plastic: Acrylic based, high performance coating that protects against weather, salts and pollutants.
 - a. Aluminum slat wall rainscreens.
 - b. Color: Black.
- F. Primer:
1. StoGuard Primer: Rubber resin emulsion primer for use with StoGuard Tape to enhance adhesion.
- G. Auxiliary Materials: Other manufacturers may submit for prior approval per Section 01 60 00 "Product Requirements".
1. Wet Sealant: Dow Corning 758, 790, 791, and 795 sealants.
 2. Pre-cured Sealant Tape: Dow 123.
 3. Spray Adhesive: 3M Super 77 Spray Adhesive.
 4. Spray Foam: Dow Great Stuff for Gaps and Cracks.
- H. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, 0.0187 inch (0.5 mm) thick and Series 300 stainless-steel fasteners.
- I. Joint Sealant: ASTM C 920, single-component, neutral-curing silicone; Class 100/50 (low modulus), Grade NS, Use NT related to exposure and, as applicable to joint substrates indicated, Use O. Comply with Section 07 92 00 "Joint Sealants".
- J. Termination Mastic: Air-barrier manufacturer's standard cold fluid-applied elastomeric liquid; trowel grade.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
 2. Verify that concrete has cured and aged for minimum time period recommended by air-barrier manufacturer.
 3. Verify that concrete is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
 4. Verify that masonry joints are flush and completely filled with mortar.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- A. Clean, prepare, treat and seal substrate according to manufacturer's written instructions. Provide clean, dust-free and dry substrate for air-barrier application.
- B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds and other penetrating contaminants or film-forming coatings from concrete.
- D. Remove fins, ridges, mortar and other projections and fill honeycomb, aggregate pockets, holes and other voids in concrete with substrate-patching membrane.
- E. Remove excess mortar from masonry ties, shelf angles and other obstructions.
- F. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one (1) plane to another.
- G. Cover gaps in substrate plane and form a smooth transition from one (1) substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

3.3 JOINT TREATMENT

- A. Concrete and Masonry: Prepare, treat, rout and fill joints and cracks in substrate according to ASTM C 1193 and air-barrier manufacturer's written instructions. Remove dust and dirt from joints and cracks complying with ASTM D 4258 before coating surfaces.
 - 1. Prime substrate and apply a single thickness of air-barrier manufacturer's recommended preparation coat extending a minimum of 3 inches (75 mm) along each side of joints and cracks. Apply a double thickness of fluid air-barrier material and embed a joint reinforcing strip in preparation coat.
- B. Gypsum Sheathing: Fill joints greater than 1/4 inch (6 mm) with sealant according to ASTM C 1193 and air-barrier manufacturer's written instructions. Apply first layer of fluid air-barrier material at joints. Tape joints with joint reinforcing strip after first layer is dry. Apply a second layer of fluid air-barrier material over joint reinforcing strip.

3.4 TRANSITION STRIP INSTALLATION

- A. General: Install strips, transition strips and accessory materials according to air-barrier manufacturer's written instructions to form a seal with adjacent construction and maintain a continuous air barrier.
 - 1. Coordinate the installation of air barrier with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
- B. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by fluid air-barrier material on same day. Re-prime areas exposed for more than twenty-four (24) hours.

1. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.
- C. Connect and seal exterior wall air-barrier material continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing and other construction used in exterior wall openings, using accessory materials.
- D. At end of each working day, seal top edge of strips and transition strips to substrate with termination mastic.
- E. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- F. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, doors and miscellaneous penetrations of air-barrier material with foam sealant.
- G. Seal strips and transition strips around masonry reinforcing or ties and penetrations with termination mastic.
- H. Seal exposed edges of strips at seams, cuts, penetrations and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
- I. Repair punctures, voids and deficient lapped seams in strips and transition strips. Slit and flatten fishmouths and blisters. Patch with transition strips extending 6 inches (150 mm) beyond repaired areas in strip direction.

3.5 FLUID AIR-BARRIER MEMBRANE INSTALLATION

- A. General: Apply fluid air-barrier material to form a seal with strips and transition strips and to achieve a continuous air barrier according to air-barrier manufacturer's written instructions. Apply fluid air-barrier material within manufacturer's recommended application temperature ranges.
 1. Apply primer to substrates at required rate and allow it to dry.
 2. Limit priming to areas that will be covered by fluid air-barrier material on same day. Re-prime areas exposed for more than twenty-four (24) hours.
 3. Prime glass-fiber-surfaced gypsum sheathing with number of prime coats needed to achieve required bond, with adequate drying time between coats.
- B. Membrane Air Barriers: Apply a continuous unbroken air-barrier membrane to substrates according to the following thickness. Apply air-barrier membrane in full contact around protrusions such as masonry ties.
 1. Vapor-Permeable Membrane Air Barrier: Total 10 mil (0.25 mm), applied in one (1) or more equal coats.
- C. Apply strip and transition strip over cured air-barrier material overlapping 3 inches (75 mm) onto each surface according to air-barrier manufacturer's written instructions.
- D. Do not cover air barrier until it has been tested and inspected by Owner's testing agency.

- E. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.6 FIELD QUALITY CONTROL

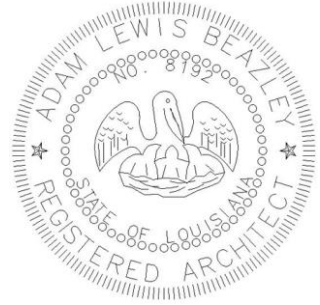
- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Inspections: Air-barrier materials, accessories and installation are subject to inspection for compliance with requirements. Inspections may include the following:
 - 1. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.
 - 2. Continuous structural support of air-barrier system has been provided.
 - 3. Masonry and concrete surfaces are smooth, clean and free of cavities, protrusions and mortar droppings.
 - 4. Site conditions for application temperature and dryness of substrates have been maintained.
 - 5. Maximum exposure time of materials to UV deterioration has not been exceeded.
 - 6. Surfaces have been primed, if applicable.
 - 7. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.
 - 8. Termination mastic has been applied on cut edges.
 - 9. Strips and transition strips have been firmly adhered to substrate.
 - 10. Compatible materials have been used.
 - 11. Transitions at changes in direction and structural support at gaps have been provided.
 - 12. Connections between assemblies (air-barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity and continuity of seal.
 - 13. All penetrations have been sealed.
- C. Tests: As determined by Owner's testing agency from among the following tests:
 - 1. Qualitative Air-Leakage Testing: Air-barrier assemblies will be tested for evidence of air leakage according to ASTM E 1186, smoke pencil with pressurization or depressurization.
 - 2. Quantitative Air-Leakage Testing: Air-barrier assemblies will be tested for air leakage according to ASTM E 783.
 - 3. Adhesion Testing: Air-barrier assemblies will be tested for minimum air-barrier adhesion of 30 lbf/sq. in. (207 kPa) according to ASTM D 4541 for each 600 sq. ft. (56 sq. m) of installed air barrier or part thereof.
- D. Air barriers will be considered defective if they do not pass tests and inspections.
 - 1. Apply additional air-barrier material, according to manufacturer's written instructions, where inspection results indicate insufficient thickness.
 - 2. Remove and replace deficient air-barrier components for retesting as specified above.
- E. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.

3.7 CLEANING AND PROTECTION

- A. Protect air-barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
 - 1. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. If exposed to these conditions for more than thirty (30) days, remove and replace air barrier or install additional, full-thickness, air-barrier application after repairing and preparing the overexposed membrane according to air-barrier manufacturer's written instructions.
 - 2. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.
- B. Clean spills, stains and soiling from construction that would be exposed in the completed Work using cleaning agents and procedures recommended by manufacturer of affected construction.
- C. Remove masking materials after installation.

END OF SECTION 07 27 26

SECTION 07 54 23 - THERMOPLASTIC POLYOLEFIN
(TPO) ROOFING



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. Adhered thermoplastic polyolefin (TPO) roofing system.
2. Roof insulation.

- B. Section includes the installation of insulation strips in ribs of roof deck. Insulation strips are furnished under Section 053100 "Steel Decking."

C. Related Requirements:

1. Section 061000 "Rough Carpentry" wood nailers, curbs, and blocking; and for wood-based, structural-use roof deck panels.
2. Section 070150.19 "Preparation for Re-Roofing" for re-cover board beneath new roofing.
3. Section 072100 "Thermal Insulation" for insulation beneath the roof deck.
4. Section 076200 "Sheet Metal Flashing and Trim" for metal roof flashings and counterflashing.
5. Section 079200 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.3 DEFINITIONS

- A. Roofing Terminology: Definitions in ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of products.

- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work, including:

1. Base flashings and membrane terminations.
2. Tapered insulation, including slopes.

3. Roof plan showing orientation of steel roof deck and orientation of roofing, fastening spacings, and patterns for mechanically fastened roofing.
4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

C. Samples for Verification: For the following products:

1. Sheet roofing, of color required.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and manufacturer.
- B. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
- C. Product Test Reports: For components of roofing system, tests performed by manufacturer and witnessed by a qualified testing agency.
- D. Sample Warranties: For manufacturer's special warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For roofing system to include in maintenance manuals.

1.7 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 manufacturer's special warranty.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation 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.

1.9 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.10 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
1. Special warranty includes roofing, base flashings, roof insulation, cover boards, and other components of roofing system.
 2. Warranty Period: 15 years from date of Substantial Completion.
- B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, including all components of roofing system such as roofing, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, roof pavers, and walkway products, for the following warranty period:
1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- 1) Mule-Hide Products Co., Inc:
 - 2) Carlisle Syntec Systems
 - 3) Elevate; Amrize Building Envelope LLC
 - 4) GAF
 - 5) Johns Manville
- B. Source Limitations: Obtain components for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.
1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
 2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D 4272.
- B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.

- C. Roofing System Design: Tested by a qualified testing agency to resist the uplift pressures specified in structural drawings:
- D. FM Global Listing: Roofing, base flashings, and component materials shall comply with requirements in FM Global 4450 or FM Global 4470 as part of a built-up roofing system, and shall be listed in FM Global's "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Global markings.
 - 1. Fire/Windstorm Classification: Class 1A-90.
 - 2. Hail-Resistance Rating: MH.
- E. Energy Performance: Roofing system shall have an initial solar reflectance of not less than 0.70 and an emissivity of not less than 0.75 when tested according to CRRC-1.
- F. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
- G. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

2.3 TPO ROOFING

- A. Fabric-Reinforced TPO Sheet: ASTM D 6878, internally fabric- or scrim-reinforced, uniform, flexible fabric-backed TPO sheet.
 - 1. Thickness: 60 mils, nominal.
 - 2. Exposed Face Color: White.

2.4 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing.
 - 1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: Manufacturer's standard unreinforced TPO sheet flashing, 55 mils thick, minimum, of same color as TPO sheet.
- C. Bonding Adhesive: Manufacturer's standard, water based.
- D. Slip Sheet: Manufacturer's standard, of thickness required for application.
- E. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.
- F. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick, prepunched.
- G. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roofing to substrate, and acceptable to roofing system manufacturer.

- H. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.5 ROOF INSULATION

- A. General: Preformed roof insulation boards manufactured[or approved] by TPO roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated and that produce FM Global-approved roof insulation.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
- C. Perlite Board Insulation: ASTM C 728, rigid, mineral-aggregate thermal insulation board composed of expanded perlite, cellulosic fibers, binders, and waterproofing agents with top surface seal coated.
- D. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches unless otherwise indicated.
- E. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.6 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with roofing.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.
- C. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:
 - 1. Modified asphaltic, asbestos-free, cold-applied adhesive.
 - 2. Bead-applied, low-rise, one-component or multicomponent urethane adhesive.
 - 3. Full-spread spray-applied, low-rise, two-component urethane adhesive.
- D. Cover Board: ASTM C 208, Type II, Grade 2, cellulosic-fiber insulation board, 1/2 inch thick.
- E. Protection Mat: Woven or nonwoven polypropylene, polyolefin, or polyester fabric, water permeable and resistant to UV degradation, type and weight as recommended by roofing system manufacturer for application.

2.7 ASPHALT MATERIALS

- A. Roofing Asphalt: ASTM D 312, Type III or Type IV ASTM D 6152, SEBS modified.
- B. Asphalt Primer: ASTM D 41/D 41M.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work:
 - 1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
 - 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 - 3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Section 053100 "Steel Decking."
 - 4. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.
 - 5. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
 - 6. Verify that concrete-curing compounds that will impair adhesion of roofing components to roof deck have been removed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Install insulation strips according to acoustical roof deck manufacturer's written instructions.

3.3 ROOFING INSTALLATION, GENERAL

- A. Install roofing system according to roofing system manufacturer's written instructions.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.
- C. Install roofing and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition[and to not void warranty for existing roofing system].

3.4 SUBSTRATE BOARD INSTALLATION

- A. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.

1. Fasten substrate board to top flanges of steel deck according to recommendations in FM Global's "RoofNav" and FM Global Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification.
2. Fasten substrate board to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof according to roofing system manufacturers' written instructions.

3.5 INSULATION INSTALLATION

- A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Install tapered insulation under area of roofing to conform to slopes indicated.
- D. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.
 1. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.
- E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
 1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
- G. Adhered Insulation: Install each layer of insulation and adhere to substrate as follows:
 1. Prime surface of concrete deck with asphalt primer at rate of 3/4 gal./100 sq. ft. and allow primer to dry.
 2. Set each layer of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F of equiviscous temperature.
 3. Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 4. Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
- H. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
 1. Fasten insulation according to requirements in FM Global's "RoofNav" for specified Windstorm Resistance Classification.
 2. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.

- I. Mechanically Fastened and Adhered Insulation: Install each layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
 - 1. Fasten first layer of insulation according to requirements in FM Global's "RoofNav" for specified Windstorm Resistance Classification.
 - 2. Fasten first layer of insulation to resist uplift pressure at corners, perimeter, and field of roof.
 - 3. Set each subsequent layer of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F of equiviscous temperature.
 - 4. Set each subsequent layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - 5. Set each subsequent layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
- J. Loosely Laid Insulation: Loosely lay insulation units over substrate.
- K. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction. Loosely butt cover boards together and fasten to roof deck.
 - 1. Fasten cover boards according to requirements in FM Global's "RoofNav" for specified Windstorm Resistance Classification.
 - 2. Fasten cover boards to resist uplift pressure at corners, perimeter, and field of roof.

3.6 ADHERED ROOFING INSTALLATION

- A. Adhere roofing over area to receive roofing according to roofing system manufacturer's written instructions. Unroll roofing and allow to relax before retaining.
- B. Start installation of roofing in presence of roofing system manufacturer's technical personnel.
- C. Accurately align roofing, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Bonding Adhesive: Apply to substrate and underside of roofing at rate required by manufacturer, and allow to partially dry before installing roofing. Do not apply to splice area of roofing.
- E. In addition to adhering, mechanically fasten roofing securely at terminations, penetrations, and perimeter of roofing.
- F. Apply roofing with side laps shingled with slope of roof deck where possible.
- G. Seams: Clean seam areas, overlap roofing, and hot-air weld side and end laps of roofing and sheet flashings according to manufacturer's written instructions, to ensure a watertight seam installation.
 - 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet.
 - 2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
 - 3. Repair tears, voids, and lapped seams in roofing that do not comply with requirements.

- H. Spread sealant bed over deck-drain flange at roof drains, and securely seal roofing in place with clamping ring.

3.7 MECHANICALLY FASTENED ROOFING INSTALLATION

- A. Mechanically fasten roofing over area to receive roofing according to roofing system manufacturer's written instructions. Unroll roofing and allow to relax before retaining.
 - 1. For in-splice attachment, install roofing with long dimension perpendicular to steel roof deck flutes.
- B. Start installation of roofing in presence of roofing system manufacturer's technical personnel.
- C. Accurately align roofing, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Mechanically fasten or adhere roofing securely at terminations, penetrations, and perimeter of roofing.
- E. Apply roofing with side laps shingled with slope of roof deck where possible.
- F. In-Seam Attachment: Secure one edge of TPO sheet using fastening plates or metal battens centered within seam, and mechanically fasten TPO sheet to roof deck.
- G. Seams: Clean seam areas, overlap roofing, and hot-air weld side and end laps of roofing and sheet flashings according to manufacturer's written instructions to ensure a watertight seam installation.
 - 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet.
 - 2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
 - 3. Repair tears, voids, and lapped seams in roofing that do not comply with requirements.
- H. Spread sealant bed over deck-drain flange at roof drains, and securely seal roofing in place with clamping ring.

3.8 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.9 FIELD QUALITY CONTROL

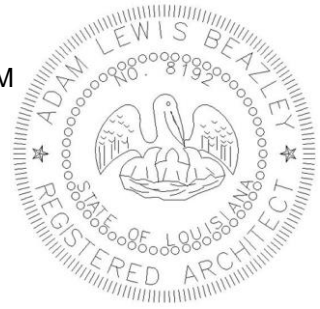
- A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
- B. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.
- C. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.10 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075423

SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM



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. Formed roof-drainage sheet metal fabrications.
2. Formed low-slope roof sheet metal fabrications.
3. Formed wall sheet metal fabrications.

B. Related Requirements:

1. Section 06 10 00 "Rough Carpentry" for wood nailers, curbs, and blocking.
2. Section 07 92 00 "Joint Sealants".

1.3 COORDINATION

- A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed and joints and seams in adjacent materials.
- B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints and seams to provide leakproof, secure and noncorrosive installation.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles and finishes for each manufactured product and accessory.

B. Shop Drawings: For sheet metal flashing and trim.

1. Include identification of material, thickness, weight, and finish for each item and location in Project.
2. Include details for forming, including profiles, shapes, seams and dimensions.
3. Detail formed flashing and trim at scale of not less than 1-1/2 inches per 12 inches (1:10).

C. Samples for Initial Selection: For each type of sheet metal and accessory indicated with factory-applied finishes.

D. Samples for Verification: For each type of exposed finish.

1. Sheet Metal Flashing: 12 inches long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures and other attachments.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. Manufacture and install roof edge flashings that meet or exceed structural windstorm requirements identified on the structural Drawings for the Project.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

- B. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, dead soft, fully annealed; with smooth, flat surface.
 - 1. Finish: 2B (bright, cold rolled).
- C. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required.
 - 1. Color Anodic Finish, Coil Coated: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
 - a. Color: To be selected from manufacturer's full range.

2.3 UNDERLAYMENT MATERIALS

- A. Felt: ASTM D 226/D 226M, Type II (No. 30), asphalt-saturated organic felt; non-perforated.
- B. Self-Adhering, High-Temperature Sheet: Minimum 30 mils thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer.
 - 1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F or higher.
 - 2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F or lower.
- C. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft. minimum.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, protective coatings, sealants and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.
 - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
 - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 - c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.
 - 2. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
 - 3. Fasteners for Aluminum-Zinc Alloy-Coated Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

- C. Solder:
 - 1. For Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
- D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, non-sag, non-toxic, non-staining tape 1/2 inch wide and 1/8 inch thick.
- E. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- G. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.
- H. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.5 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
 - 1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 - 2. Obtain field measurements for accurate fit before shop fabrication.
 - 3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels and slopes; and with exposed edges folded back to form hems.
 - 4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8 inch offset of adjoining faces and of alignment of matching profiles.
- C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.
 - 2. Use lapped expansion joints only where indicated on Drawings.
- D. Sealant Joints: Where movable, non-expansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

- F. Seams: Fabricate non-moving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.
- G. Do not use graphite pencils to mark metal surfaces.

2.6 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Roof Edge Flashing and Fascia Cap: Fabricate in minimum 96 inch long, but not exceeding 12 foot long sections. Furnish with 6 inch wide, joint cover plates.
 - 1. Joint Style: Butted with expansion space and 6 inch wide, exposed cover plate.
 - 2. Fabricate with scuppers where indicated to dimensions required with 4 inch wide flanges and base extending 4 inches beyond cant or tapered strip into field of roof. Fasten gravel guard angles to base of scupper.
 - 3. Fabricate from the Following Materials:
 - a. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.
 - 1) Color: To be selected from manufacturer's full range.
- B. Counterflashing: Fabricate from the following materials:
 - 1. Stainless Steel: 0.028 inch thick.
- C. Flashing Receivers: Fabricate from the following materials:
 - 1. Stainless Steel: 0.022 inch thick.
- D. Vent Stack Flashings:
 - 1. Soft sheet lead, 2-1/2 pound per square foot.
- E. Roof-Penetration Flashing: Fabricate from the following materials:
 - 1. Stainless Steel: 0.022 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.
 - 1. Verify compliance with requirements for installation tolerances of substrates.
 - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage and securely anchored.
 - 3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

- A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps and edges with roller. Cover underlayment within fourteen (14) days.
- B. Apply slip sheet, wrinkle free, over underlayment before installing sheet metal flashing and trim.
 - 1. A separate slip sheet may be eliminated if the Sheet Underlayment has an integral slip sheet surface.

3.3 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - 1. Install sheet metal flashing and trim true to line, levels and slopes. Provide uniform, neat seams with minimum exposure of solder, welds and sealant.
 - 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 - 3. Space cleats not more than 12 inches apart. Attach each cleat with at least two (2) fasteners. Bend tabs over fasteners.
 - 4. Install exposed sheet metal flashing and trim with limited oil canning and free of buckling and tool marks.
 - 5. Torch cutting of sheet metal flashing and trim is not permitted.
 - 6. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
 - 1. Coat concealed side of uncoated-aluminum sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
 - 2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints when lapped joints cannot be used or will not be sufficiently water tight.
- D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch (19 mm) for wood screws.

- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction.
 - 1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
 - 2. Prepare joints and apply sealants to comply with requirements in Section 07 92 00 "Joint Sealants".

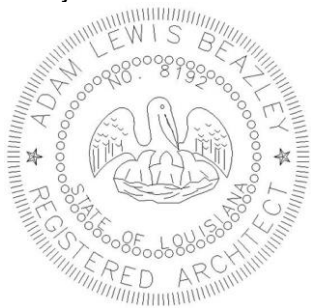
3.4 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal flashing and trim to comply with performance requirements and cited sheet metal standard. Provide concealed fasteners where possible and set units true to line, levels and slopes. Install work with laps, joints and seams that are permanently watertight and weather resistant.
- B. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.
- C. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints minimum of 4 inches. Secure in waterproof manner by means of anchor and washer at 36 inch centers unless otherwise indicated.
- D. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.5 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8 inch offset of adjoining faces and of alignment of matching profiles.
- B. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing".

END OF SECTION 07 62 00



SECTION 07 92 00 - JOINT SEALANTS

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. Silicone joint sealants.
 - 2. Urethane joint sealants.
 - 3. Latex joint sealants.
 - 4. Acoustical joint sealants.
- B. Related Sections:
 - 1. Section 09 29 00 "Gypsum Board" for sealing perimeter joints.

1.3 PRECONSTRUCTION TESTING

- A. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:
 - 1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
 - 2. Conduct field tests for each application indicated below:
 - a. Each kind of sealant and joint substrate indicated.
 - 3. Notify Architect seven (7) days in advance of dates and times when test joints will be erected.
 - 4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.
 - a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
 - 1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one (1) side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 - 5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint

substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.

6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.4 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product indicated.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Joint-Sealant Schedule: Include the following information:
 1. Joint-sealant application, joint location and designation.
 2. Joint-sealant manufacturer and product name.
 3. Joint-sealant formulation.
 4. Joint-sealant color.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.
- B. Preconstruction Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.
- C. Preconstruction Field-Adhesion Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

1.7 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F.
 2. When joint substrates are wet.

3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 WARRANTY

- A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 1. Warranty Period: Two (2) years from date of Substantial Completion.
- B. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
 1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 2. Disintegration of joint substrates from natural causes exceeding design specifications.
 3. Mechanical damage caused by individuals, tools, or other outside agents.
 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class and uses related to exposure and joint substrates.
 1. Suitability for Immersion in Liquids. Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is de-ionized water, unless otherwise indicated.
- C. Stain-Test-Response Characteristics: Where sealants are specified to be non-staining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- D. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provide products that comply with 21 CFR 177.2600.
- E. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

- A. Single-Component, Non-sag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include the following:
 - a. Dow Chemical Company; 790.
 - b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
 - c. May National Associates, Inc.; Bondaflex Sil 290 Bondaflex Sil 728 NS.
 - d. Pecora Corporation; 301 NS 311 NS 890 890FTS.
 - e. Sika Corporation, Construction Products Division; SikaSil-C990.
 - f. Tremco Incorporated; Spectrem 1 Spectrem 800.
- B. Single-Component, Non-Sag Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use T.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Dow Chemical Company; NS Parking Structure Sealant.
- C. Mildew-resistant Silicon Rubber Sealant: Silicone rubber based, one-part, non-sag elastomeric mildew resistant sealant.
 - 1. Products:
 - a. Don 786 Mildew Resistant Silicone Sealant.
 - b. General Electric, Sanitary 1700.

2.3 LATEX JOINT SEALANTS

- A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. BASF Building Systems; Sonolac.
 - b. Pecora Corporation; AC-20+.
 - c. Tremco Incorporated; Tremflex 834.

2.4 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Joint Sealant: Manufacturer's standard non-sag, paintable, non-staining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Pecora Corporation; AC-20 FTR.
 - b. USG Corporation; Sheetrock Acoustical Sealant.

2.5 JOINT SEALANT BACKING

- A. General: Provide sealant backings of material that are non-staining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) Type O (open-cell material) Type B (bi-cellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.6 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Non-porous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Non-staining, non-absorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate

capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

- a. Concrete.
 - b. Masonry.
 - c. Unglazed surfaces of ceramic tile.
- 3. Remove laitance and form-release agents from concrete.
 - 4. Clean non-porous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
 - c. Porcelain enamel.
 - d. Glazed surfaces of ceramic tile.

Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

- B. **Masking Tape:** Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. **General:** Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. **Sealant Installation Standard:** Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications and conditions indicated.
- C. **Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.**
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. **Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.**
- E. **Install sealants using proven techniques that comply with the following and at the same time backings are installed:**
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

- F. Tooling of Non-Sag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets and to ensure contact and adhesion of sealant with sides of joint.
1. Remove excess sealant from surfaces adjacent to joints.
 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
 4. Provide flush joint profile where indicated per Figure 8B in ASTM C 1193.
 5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 8C in ASTM C 1193.
 - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.
- G. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations.

3.4 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
1. Extent of Testing: Test completed and cured sealant joints as follows:
 - a. Perform five (5) tests for the first 500 feet (150 m) of joint length for each kind of sealant and joint substrate.
 - b. Perform one (1) test for each 500 feet (150 m) of joint length thereafter.
 2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
 - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one (1) side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 3. Inspect tested joints and report on the following:
 - a. Whether sealants filled joint cavities and are free of voids.
 - b. Whether sealant dimensions and configurations comply with specified requirements.
 - c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
 4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration and sealant dimensions.

5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

- B. Evaluation of Field-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original Work.

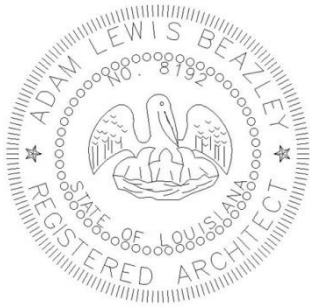
3.7 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal non-traffic surfaces JS-1.
 1. Joint Locations:
 - a. Control and expansion joints in unit masonry.
 - b. Joints between metal panels.
 - c. Joints between different materials listed above.
 - d. Perimeter joints between materials listed above and frames of door and windows.
 2. Silicone Joint Sealant: Single component, non-sag, neutral curing, Class 100/50 for use NT.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Joint-Sealant Application: Interior joints in horizontal traffic surfaces JS-2.
 1. Joint Locations:
 - a. Control and expansion joints in tile flooring.
 2. Silicone Joint Sealant: Single component, non-sag, neutral curing, Class 100/50, for use T.
- C. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal non-traffic surfaces JS-3.

1. Joint Locations:
 - a. Perimeter joints of exterior openings where indicated.
 - b. Vertical joints on exposed surfaces of interior unit masonry, walls and partitions.
 - c. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
 2. Joint Sealant: Latex.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal non-traffic surfaces JS-4.
1. Joint Sealant Location:
 - a. Joints between plumbing fixtures and adjoining walls, floors and counters.
 - b. Tile control and expansion joints where indicated.
 2. Silicon Joint Sealant: Mildew Resistant Silicon Rubber.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- E. Joint-Sealant Application: Interior acoustical joints in vertical surfaces and horizontal non-traffic surfaces JS-5.
1. Joint Sealant Location:
 - a. Acoustical joints where indicated.
 - b. Other joints where indicated.
 2. Joint-Sealant: Acoustical.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 07 92 00

SECTION 08 11 13 - 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 hollow-metal work.
- B. Related Requirements:
 - 1. Section 08 71 00 "Door Hardware" for door hardware for hollow-metal doors.

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.4 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include the following:
 - 1. Elevations of each door type.
 - 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 each different wall opening condition.
 - 6. Details of anchorages, joints, field splices, and connections.
 - 7. Details of accessories.
- C. Schedule: Provide a schedule of hollow-metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final Door Hardware Schedule.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.
 - 1. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4 inch (102 mm) high wood blocking. Provide minimum 1/4 inch (6 mm) space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - 1. Amweld International, LLXC.
 - 2. Ceco Door Products.
 - 3. Curries Company.
- B. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

2.2 REGULATORY REQUIREMENTS

- A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

2.3 INTERIOR DOOR FRAMES

- A. Construct interior door frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Commercial Door Frames: NAAMM-HMMA 861. At locations indicated in the Door and Frame Schedule.
 - 1. Physical Performance: Level A according to SDI A250.4.
 - 2. Frames:
 - a. Materials: Uncoated steel sheet, minimum thickness of 0.053 inch (1.3 mm) for door openings 48 inches (1219 mm) or less, or window frames; minimum thickness of 0.067 inch (1.7 mm) for door openings greater than 48 inches (1219 mm).
 - b. Construction: Full profile welded.
 - c. Face Dimensions:
 - 1) 2 inch at jambs.
 - 2) 4 inch at head in Concrete Masonry Unit walls.
 - 3) 2 inch at head in framed walls.

3. Exposed Finish: Prime.

2.4 EXTERIOR HOLLOW-METAL DOORS AND FRAMES

- A. Construct exterior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Commercial Doors and Frames: NAAMM-HMMA 861. At locations indicated in the Door and Frame Schedule.
 1. Physical Performance: Level A according to SDI A250.4.
 2. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches (44.5 mm.)
 - c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.30 mm), with minimum G60 (Z180 or) A60 (ZF180) coating.
 - 1) 2 inch face at jamb.
 - 2) 4 inch face at head.
 - d. Edge Construction: Continuously welded with no visible seam.
 - e. Core: Steel stiffened.
 - 1) Thermal-Rated Doors: Provide doors fabricated with thermal-resistance value (R-value) of not less than 2.1 deg F x h x sq. ft./Btu (0.370 K x sq. m/W) when tested according to ASTM C 1363.
 3. Frames:
 - a. Materials: Metallic-coated steel sheet, minimum thickness of 0.067 inch (1.7 mm), with minimum G60 (Z180 or) A60 (ZF180) coating.
 - b. Construction: Full profile welded.
 4. Exposed Finish: Prime.

2.5 FRAME ANCHORS

- A. Jamb Anchors:
 1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch (1.0 mm) thick, with corrugated or perforated straps not less than 2 inches (51 mm) wide by 10 inches (254 mm) long; or wire anchors not less than 0.177 inch (4.5 mm) thick.
 2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.
- B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch (1.0 mm), and as follows:
 1. Monolithic Concrete Slabs: Clip-type anchors, with two (2) holes to receive fasteners.

2.6 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.
- D. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.
 - 1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.
- E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- F. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- G. Grout: ASTM C 476, except with a maximum slump of 4 inches (102 mm), as measured according to ASTM C 143/C 143M.
- H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- I. Glazing: Comply with requirements in Section 08 80 00 "Glazing."
- J. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15 mil (0.4 mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.7 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 metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Hollow-Metal Doors:
 - 1. Fire Door Cores: As required to provide fire-protection ratings indicated.
 - 2. Vertical Edges for Single-Acting Doors: Bevel edges 1/8 inch in 2 inches (3.2 mm in 51 mm).
 - 3. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets.
 - 4. Bottom Edge Closures: Close bottom edges of doors where required for attachment of weather stripping with end closures or channels of same material as face sheets.
 - 5. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.

6. Astragals: Provide overlapping astragal on one (1) leaf of pairs of doors where required by NFPA 80 for fire-performance rating. Extend minimum 3/4 inch (19 mm) beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.
- C. Hollow-Metal Frames: 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.
1. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 2. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
 3. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry Type: Locate anchors not more than 16 inches (406 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c., to match coursing, and as follows:
 - 1) Two (2) anchors per jamb up to 60 inches (1524 mm) high.
 - 2) Three (3) anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
 - 3) Four (4) anchors per jamb from 90 to 120 inches (2286 to 3048 mm) high.
 - 4) Four (4) anchors per jamb plus one (1) additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 120 inches (3048 mm) high.
 - b. Stud-Wall Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:
 - 1) Three (3) anchors per jamb up to 60 inches (1524 mm) high.
 - 2) Four (4) anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
 - 3) Five (5) anchors per jamb from 90 to 96 inches (2286 to 2438 mm) high.
 - 4) Five (5) anchors per jamb plus one (1) additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 96 inches (2438 mm) high.
 4. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Single-Door Frames: Drill stop in strike jamb to receive three (3) door silencers.
 - b. Double-Door Frames: Drill stop in head jamb to receive two (2) door silencers.
- D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.
- E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
1. Reinforce doors and frames to receive non-templated, mortised, and surface-mounted door hardware.
 2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for preparation of hollow-metal work for hardware.
- F. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with mitered hairline joints.

1. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
2. Provide loose stops and moldings on inside of hollow-metal work.
3. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.

2.8 STEEL FINISHES

- A. Prime Finish: Clean, pre-treat, and apply manufacturer's standard primer.
 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

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. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. 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. Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

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 SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

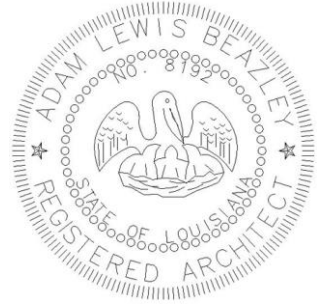
- a. At fire-rated openings, install frames according to NFPA 80.
 - b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - c. Install door silencers in frames before grouting.
 - d. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - e. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - f. Field apply bituminous coating to backs of frames that will be filled with grout containing anti-freezing agents.
2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of post-installed expansion anchors if so indicated and approved on Shop Drawings.
3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
 4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
 5. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.
- C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
 1. Non-Fire-Rated Steel Doors:
 - a. Between Door and Frame Jambs and Head: 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).
 - b. Between Edges of Pairs of Doors: 1/8 inch (3.2 mm) to 1/4 inch (6.3 mm) plus or minus 1/32 inch (0.8 mm).
 - c. At Bottom of Door: 5/8 inch (15.8 mm) plus or minus 1/32 inch (0.8 mm).
 - d. Between Door Face and Stop: 1/16 inch (1.6 mm) to 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).
 2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

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 Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- D. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION 08 11 13



SECTION 08 14 16 – FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Flush wood doors; flush configuration; fire-rated, non-rated and acoustical.

1.2 RELATED REQUIREMENTS

- A. Section 08 11 13 "Hollow Metal Doors and Frames".
- B. Section 08 71 00 "Door Hardware".
- C. Section 08 80 00 "Glazing".

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated, include details of core and edge construction, louvers, trim for openings and WDMA I.S. 1-A classifications. Include factory finishing specifications.
- B. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
- C. Test Reports: Show compliance with specified requirements for the following:
 - 1. Sound-retardant doors and frames; sealed panel tests are not acceptable.
- D. Samples for Initial Selection: For factory finished doors.
 - 1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three (3) samples showing typical range of color and grain to be expected in the finished work.
 - 2. Corner sections of doors, 8 by 10 inches, with door faces and edges representing actual materials to be used.
 - a. Provide samples for each species of veneer and core material.
 - b. Finish veneer faced door samples with same materials proposed for factory finished doors.
 - 3. Frames for light openings, 6 inches long, for each material, type and finish required.
- E. Samples for Verification: Submit two (2) samples of door construction, 8 by 8 inch in size cut from top corner of door.
- F. Warranty: Provide sample of manufacturer's warranty.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain flush wood doors and veneers from single manufacturer.
- B. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A, latest edition, "Industry Standard for Architectural Wood Flush Doors".
- C. Fire Rated Wood Doors: Doors 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 at positive pressure according to NFPA 252 (neutral pressure at 40 inches above sill) or UL10C.
 - 1. 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. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for receiving, handling, and installing flush wood doors.
- E. Installed Fire Rated Door Assembly: Conform to NFPA 80 for fire rated class as scheduled.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging. Inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one (1) week. Break seal on site to permit ventilation.
- D. Mark each door on top rail with opening number used on Shop Drawings.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install doors until spaces are enclosed and weather tight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.7 WARRANTY

- A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to the following:
 - a. Warping (bow, cup or twist) more than 1/4 inch in a 42 by 84 inch section.

- b. Telegraphing of core construction in wood face veneers exceeding 0.01 inch in a 3 inch span.
- 2. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.
- 3. Warranty Period for Solid Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Wood Veneer Faced Doors:

- 1. Basis of Design: Masonite Architectural, Asprio Series.
- 2. Acceptable Manufacturers:
 - a. Eggers Industries; Premium Series; www.eggersindustries.com.
 - b. Graham Wood Doors: www.grahamdoors.com.
 - c. Marshfield-Algoma (MF); Signature Series; www.marshfielddoors.com.

2.2 WOOD-BASED COMPONENTS

- A. Wood fabricated from old growth timber is not permitted.

2.3 DOORS

A. Doors: Refer to Drawings for locations and additional requirements.

- 1. Quality Standard: Premium Grade, Extra Heavy Duty performance, in accordance with WDMA I.S. 1A.
- 2. Fire-Rated Doors: Tested to ratings indicated on Drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc. (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.
 - a. Category A Edge Construction: Provide fire rated door edge construction with intumescent seals concealed by outer stile (Category A) at forty-five (45), sixty (60), and ninety (90) minute rated doors. Comply with specified requirements for exposed edges.
 - b. Pairs: Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
 - 1) Provide fire retardant stiles that are listed and labeled for applications indicated without formed steel edges and astragals.
 - 2) Where required for concealed hardware, provide formed steel edges and astragals with intumescent seals. Finish steel edges and astragals with baked enamel.
- 3. Wood veneer facing with factory transparent finish.

2.4 DOOR AND PANEL CORES

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type structural composite lumber core (SCLC), plies made without binders containing urea formaldehyde and faces as indicated above.
- B. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.
 - 1. Edge Construction: At hinge stiles, provide laminated edge construction with improved screw holding capability and split resistance. Comply with specified requirements for exposed edges.

2.5 BLOCKING

- A. Non-Fire-Rated Doors:
 - 1. Provide blocking as indicated below:
 - a. HB3: 5 inch top and bottom rail blocking, in doors indicated to have closers and kick plates.
- B. Fire-Rated Doors:
 - 1. Provide blocking as indicated below:
 - a. HB1: 5 inch in doors indicated to have closers and overhead stops.

2.6 DOOR FACINGS

- A. Veneer Facing for Transparent Finish: Plain Sliced Red Oak.
 - 1. Finish: Aspiro Series, Marshfield-Algoma, as chosen from full range of available finishes or custom color to match Architects sample.
- B. Facing Adhesive: Type I; waterproof, containing no urea formaldehyde.

2.7 ACCESSORIES

- A. Glazing Stops: Rolled steel channel shape, mitered corners; prepared for countersink style tamper proof screws.
 - 1. Metal Frames for Light Openings in Fire-Rated Doors over twenty (20) minute Rating: 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.
 - a. Manufacturers:
 - 1) Any manufacturer recommended and supplied by the Door Manufacturer.

- B. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with the flush wood door manufacturer's written instructions.

2.8 DOOR CONSTRUCTION

- A. Fabricate doors in accordance with door quality standard specified.
- B. Cores Constructed with Stiles and Rails:
 - 1. Provide 5 inch top rail blocking in doors indicated to have closers.
- C. Glazed Openings: Non-removable stops on non-secure side; sizes and configurations as indicated on Drawings.
 - 1. Openings: Cut and trim openings through doors in factory.
 - a. Light Openings: Trim openings with moldings of material and profile indicated.
 - b. Glazing: Comply with applicable requirements in Division 08 Section "Glazing".
- D. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
 - 1. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards and hardware templates.
 - 2. Coordinate with hardware mortises in metal frames to verify dimensions and alignment before factory machining.
 - 3. Metal Astragals: Factory machine astragals and formed steel edges for hardware for pairs of fire rated doors.
- E. Factory fit doors for frame opening dimensions identified on Shop Drawing, with edge clearances in accordance with specified quality standard.
- F. Provide edge clearances in accordance with the quality standard specified.

2.9 FACTORY FINISHING – WOOD VENEER DOORS

- A. Finish Work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
 - 1. Opaque:
 - a. System-2, Lacquer, Precatalyzed.
 - b. Color: As selected by Architect.
 - c. Sheen: Semigloss.
- B. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 - 1. Finish faces, all four (4) edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.

- C. Factory finish doors in accordance with approved sample.
- D. Seal door top edge with color sealer to match door facing.

2.10 ACCESSORIES

- A. Hollow Metal Door Frames: As specified in Section 08 11 13 "Hollow Metal Doors and Frames".
- B. Glazed Openings:
 - 1. Heat-Strengthened and Fully Tempered Glass: ASTM C1048.
 - 2. Where doors are to have high sound ratings provide code compliant glazing recommended by the manufacturer to product the sound rating recommended.
- C. Glazing Stops: Rolled steel channel shape, butted corners; prepared for countersink style tamper proof screws.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting Work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Examine doors and installed door frames before hanging doors.
 - 1. Verify that frames comply with indicated requirements for type, size, location and swing characteristics and have been installed with level heads and plumb jambs.
 - 2. Reject doors with defects.
- D. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.2 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
 - 1. Install fire-rated doors in accordance with NFPA 80 requirements.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Use machine tools to cut or drill for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.
- E. Coordinate installation of glazing.

- F. Field modifications to doors shall not be permitted, except those specifically allowed by manufacturer or fire rating requirements.

3.3 TOLERANCES

- A. Conform to specified quality standard for fit and clearance tolerances.
- B. Conform to specified quality standard for telegraphing, warp and squareness.

3.4 ADJUSTING

- A. Adjust doors for smooth and balanced door movement.
 - 1. Operation: Re-hang or replace doors that do not swing or operate freely.
- B. Adjust closers for full closure.
- C. Finished Doors: Replace doors that do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

3.5 SCHEDULE – SEE DRAWINGS

- A. See the Schedule included in the Drawings.

END OF SECTION 08 14 16

SECTION 08 43 13 - ALUMINUM-FRAMED ENTRANCES
AND STOREFRONTS (BID SET REVISION 1/26/26)



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. Exterior storefront framing.
 - 2. Exterior manual-swing entrance doors.
 - 3. Hardware for entrance doors.
- B. Related Sections:
 - 1. Section 08 80 00 "Glazing".
 - 2. Section 08 71 11 "Door Hardware".

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.
 - 1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
 - 2. Include full-size isometric details of each vertical-to-horizontal intersection of aluminum-framed entrances and storefronts, showing the following:
 - a. Joinery, including concealed welds.
 - b. Anchorage.
 - c. Expansion provisions.
 - d. Glazing.
 - e. Flashing and drainage.
 - 3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.

1.5 INFORMATIONAL SUBMITTALS

- A. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.
- B. Maintenance Data for Structural Sealant: For structural-sealant-glazed storefront to include in maintenance manuals. Include ASTM C 1401 recommendations for post-installation-phase quality-control program.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated.
- C. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
 - 1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Noise or vibration created by wind and thermal and structural movements.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - d. Water penetration through fixed glazing and framing areas.
 - e. Failure of operating components.
 - 2. Warranty Period: Five (5) years from date of Substantial Completion.
- B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Deterioration includes, but is not limited to, the following:

- a. Color fading more than five (5) Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
 2. Failure also includes the following:
 - a. Thermal stresses transferring to building structure.
 - b. Glass breakage.
 - c. Noise or vibration created by wind and thermal and structural movements.
 - d. Loosening or weakening of fasteners, attachments, and other components.
 - e. Failure of operating units.
- B. Structural Loads: Wind loads shall be determined in accordance with the International Building Code, 2021 Edition and Chapter 6 of the ASCE 7-10 based on heights above grade indicated on Drawings.
1. Occupancy Risk Category II.
 2. Nominal Wind Speed: 108 mph.
 3. Ultimate Wind Speed: 139 mph
 4. Wind Exposure: Category "B".
 5. Internal Pressure Coefficient: +/- 0.18
- C. Deflection of Framing Members: At design wind pressure, as follows:
1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane not exceeding 1/175 of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
 2. Deflection Parallel to Glazing Plane: Limited to 75 percent of glass edge bite or 1/8 inch, whichever is smaller.
- D. Structural: Test according to ASTM E 330 as follows:
1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.

2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
 3. Test Durations: As required by design wind velocity, but not less than ten (10) seconds.
- E. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:
1. Fixed Framing and Glass Area:
 - a. Maximum air leakage of 0.06 cfm/sq. ft. at a static-air-pressure differential of 6.24 lbf/sq. ft.
 2. Entrance Doors:
 - a. Single Doors: Maximum air leakage of 0.5 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft.
- F. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:
1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 15.0 lbf/sq. ft.
- G. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
 2. Thermal Cycling: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.
 - a. High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of 180 deg F.
 - b. Low Exterior Ambient-Air Temperature: 0 deg F.
 - c. Interior Ambient-Air Temperature: 75 deg F.

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the work include the following:
1. Old Castle: FG-3000.
 2. Kawneer: 451T.
 3. Tubelite: 403.

2.3 FRAMING

- A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
1. Construction: Thermally broken.
 2. Glazing System: Retained mechanically with gaskets on four (4) sides.
 3. Glazing Plane: Center.

4. Finish: Dark Bronze.
 5. Fabrication Method: Field-fabricated stick system.
- B. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- D. Materials:
1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
 - a. Sheet and Plate: ASTM B 209.
 - b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
 - c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
 - d. Structural Profiles: ASTM B 308/B 308M.

2.4 ENTRANCE DOOR SYSTEMS

- A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.
1. Door Construction: 1-3/4 inch overall thickness, with minimum 0.125 inch thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
 2. Door Design: Wide stile; 5 inch nominal width.
 3. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
 4. 1 inch glazing.

2.5 ENTRANCE DOOR HARDWARE

- A. Provide door hardware for each door as scheduled on Drawings to comply with requirements in this Section.
- B. Door Hardware Sets: Provide quantity and item indicated for each hardware set scheduled in "Hardware Schedule" at the end of Part 3 and as specified in this section.
1. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
- C. Catalog numbers indicated in these specifications are to indicate series or category of product to be used and are not intended to be complete. It shall be the responsibility of the Hardware Consultant to provide complete and accurate catalog numbers providing the features and finishes specified and/or necessary for a complete and function hardware operation.
- D. Hardware listed herein matches the type, grade and manufacturer series specified in Section 08 71 11 "Door Hardware". Coordinate final selections with Door Hardware Supplier.

2.6 PIVOT HINGES:

- A. Provide Entrance Manufacturer's standard Pivots in accordance with the requirements listed below:
 - 1. BHMA A156.4, Grade 1.
 - 2. Offset-Pivot Hinges: Provide top, bottom, and intermediate offset pivots at each door leaf.
 - 3. Finish: Brushed stainless steel.

2.7 EXIT DEVICES AND AUXILIARY ITEMS

- A. Exit Devices and Auxiliary Items: BHMA A156.3. Grade 1.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - a. Yale: 6100 ED Series.
- B. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
- C. Fire Exit Devices: Devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.
- D. Exit Device Type 1 -. Concealed Vertical Rod Exit Device :
 - 1. Product: 6160ED (F).
 - 2. Grade: Grade 1.
 - 3. Actuating Bar: Push pad.
 - 4. Function: ANSI 01 – Push pad retracts vertical rods; hex key dogging; Offset Pull on pull side.
 - 5. Finish: 613E.

2.8 LOCK CYLINDERS AND KEYING

- A. Cylinders and keying provided and installed by Section 08 71 11 "Door Hardware" Supplier. Coordinate functional requirements with Door Hardware Supplier.

2.9 OPERATING TRIM, GENERAL

- A. Manufacturers: Subject to compliance with requirements, provide products by manufacturer listed for each product or equal products by other manufacturer.
- B. Standard: Comply with BHMA A156.6.

2.10 OPERATING TRIM

- A. Offset Tubular Door Pulls: 1 1/4 inch diameter pull.
 - 1. Product: Rockwood RM202.

2. Length: 18, 3 inch projection.
3. Offset: 90 degree.
4. Finish: US32D.

2.11 SURFACE CLOSERS

- A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
 1. Manufacturers: Subject to compliance with requirements, provide the products listed below:
 - a. Yale.
 2. Opening-Force Requirements:
 - a. Egress Doors: Not more than 15 lbf (67 N) to release the latch and not more than 30 lbf (133 N) to set the door in motion and not more than 15 lbf (67 N) to open the door to its minimum required width.
 - b. Latches and Exit Devices: Not more than 15 lbf (67 N) required to release latch.
 - 3.
- B. Closer – Type 1: Closer with Cover: Grade 1; Modern Type with mechanism enclosed in cover.
 1. Product: Series 5800.
 2. Mounting: Parallel arm, push side, on door.
 3. Type: Normal power range, adjustable strikes 1-6.
 4. Arms: Hold open arms.
 5. Backcheck: Adjustable, effective between 60 and 90 degrees of door opening.
 6. Cover Material: Molded plastic.
 7. Finish: Dark Bronze - 690 .
 8. Closing Power Adjustment: At least 15 percent more than minimum tested value.

2.12 DOOR GASKETING – WEATHER SEALS

- A. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - a. Pemco.
- B. Weather Seals: Perimeter seals mounted to door jamb and head:
 1. Manufacturers standard seals.
- C. Door Sweeps: Vinyl gaskets. Gasket material held in place by flat aluminum housing or flange; surface mounted to door with screws.
 1. Outside Sweep with Rain Drip:
 - a. Product: 345_PK D.

- b. Mount on outside face of door so that sweep engages the threshold when closed.

D. Overhead Rain Drip:

- a. Manufactures standard rain drip.
- b. 4 inches longer than door width.
- c. Color to match door and frame color

2.13 ASTRAGALS

A. Astragal for exterior pairs of doors:

- 1. Manufacturer's standard meeting style astragals.

2.14 THRESHOLDS

A. Thresholds: Fabricated to full width of opening indicated.

- 1. Manufacturers: Subject to compliance with requirements, provide the following:
 - a. Pemco.

B. Latching Panic Saddle Threshold with Gasket: Fluted-top metal member with gasket.

- 1. Type: Concealed fastener.
- 2. Size: 5 inch by 1/2 inch high.
- 3. Base Metal: Aluminum.
- 4. Gasket Material: Neoprene bulb.
- 5. Required undercut: min. 9/32", max 15/32"
- 6. Product: 2009_PK D.

2.15 GLAZING

A. Glazing: Comply with Section 08 80 00 "Glazing."

B. Glazing Gaskets: Comply with Section 08 80 00 "Glazing."

C. Glazing Sealants: Comply with Section 08 80 00 "Glazing."

2.16 ACCESSORIES

A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

- 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
- 2. Reinforce members as required to receive fastener threads.
- 3. Use exposed fasteners with countersunk Phillips screw heads, fabricated from 300 series stainless steel.

- B. Anchors: Three (3)-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
 - 1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.
- C. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- D. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30 mil thickness per coat.

2.17 FABRICATION

- A. Form or extrude aluminum shapes before finishing.
- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Physical and thermal isolation of glazing from framing members.
 - 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 - 5. Provisions for field replacement of glazing from exterior.
 - 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
- E. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.
- F. Storefront Framing: Fabricate components for assembly using head-and-sill-receptor system with shear blocks at intermediate horizontal members.
- G. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
 - 1. At exterior doors, provide compression weather stripping at fixed stops.
- H. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
 - 1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
 - 2. At exterior doors, provide weather sweeps applied to door bottoms.

- I. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- J. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.18 ALUMINUM FINISHES

- A. Dark Bronze Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare surfaces that are in contact with structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

3.3 INSTALLATION

- A. General:
 - 1. Comply with manufacturer's written instructions.
 - 2. Do not install damaged components.
 - 3. Fit joints to produce hairline joints free of burrs and distortion.
 - 4. Rigidly secure nonmovement joints.
 - 5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
 - 6. Seal perimeter and other joints watertight unless otherwise indicated.
- B. Metal Protection:
 - 1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
 - 2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Set continuous sill members and flashing in full sealant bed as specified in Section 079200 "Joint Sealants" to produce weathertight installation.
- D. Install components plumb and true in alignment with established lines and grades.

- E. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather-stripping contact and hardware movement to produce proper operation.
- F. Install glazing as specified in Section 08 80 00 "Glazing."
- G. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.
 - 1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
 - 2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.4 ERECTION TOLERANCES

- A. Erection Tolerances: Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:
 - 1. Plumb: 1/8 inch in 10 feet.
 - 2. Level: 1/8 inch in 20 feet.
 - 3. Alignment:
 - a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
 - b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
 - c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.
 - 4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

3.5 SCHEDULE

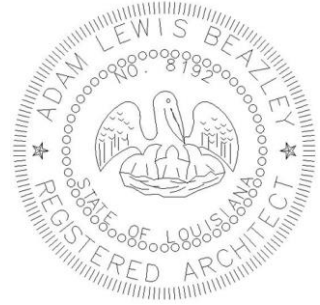
Set No. 1.1

2 Set	Pivots
2	Exit Device – Type I
2	Offset Pull
2	Closer – Type I
1 Set	Perimeter Astragal Gaskets
1	Latching Panic Saddle Threshold
2	Door Sweep
1	Rain Drip

Exterior Floor Stops and Cylinders provided under Section 08 71 00 Door Hardware.

END OF SECTION 08 43 13

SECTION 08 71 11 - DOOR HARDWARE



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. Mechanical door hardware for the following:
 - a. Swinging doors.
 - 2. Cylinders for door hardware specified in other Sections.
 - 3. Electrified door hardware.
- B. Related Sections:
 - 1. Section 08 11 13 "Hollow Metal Doors and Frames" for door silencers provided as part of hollow-metal frames.
 - 2. Section 08 41 13 "Aluminum-Framed Entrances and Storefronts" for entrance door hardware, except cylinders.
 - 3. Section 08 14 16 "Flush Wood Doors" for Wood door requirements.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Details of electrified door hardware, indicating the following:
 - 1. Wiring Diagrams: For power, signal, and control wiring and including the following:
 - a. Details of interface of electrified door hardware and building safety and security systems.
 - b. Schematic diagram of systems that interface with electrified door hardware.
 - c. Point-to-point wiring.
 - d. Risers.
 - e. Elevations doors controlled by electrified door hardware.
 - 2. Operation Narrative: Describe the operation of doors controlled by electrified door hardware.
- C. Other Action Submittals:

1. Keying Schedule: Prepared by or under the supervision of Installer, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of door hardware to include in maintenance manuals. Include final hardware schedule.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and an Architectural Hardware Consultant who is available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
 1. Scheduling Responsibility: Preparation of door hardware and keying schedules.
 2. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Source Limitations: Obtain each type of door hardware from a single manufacturer.
- C. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meet requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
 1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at the tested pressure differential of 0.3 inch wg (75 Pa) of water.
- D. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
- E. Means of Egress Doors: Latches do not require more than 15 lbf (67 N) to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- F. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines.
 1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22.2 N).
 2. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
 - b. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
 3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch (13 mm) high.

4. Adjust door closer sweep periods so that, from an open position of 70 degrees, the door will take at least three (3) seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
- B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

1.7 COORDINATION

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete. Concrete, reinforcement, and formwork requirements are specified elsewhere.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.
- E. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. Provide door hardware for each door as scheduled on Drawings to comply with requirements in this Section.
- B. Door Hardware Sets: Provide quantity and item indicated for each hardware set scheduled in "Hardware Schedule" at the end of Part 3 and as specified in this section.
 1. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
- C. Catalog numbers indicated in these specifications are to indicate series or category of product to be used and are not intended to be complete. It shall be the responsibility of the Hardware Consultant to provide complete and accurate catalog numbers providing

the features and finishes specified and/or necessary for a complete and function hardware operation.

2.2 HINGES AND PIVOTS, GENERAL

- A. Standards: Comply with the following:
 - 1. Butts and Hinges: BMHA A156.1.
 - 2. Template Hinge Dimensions: BMHA A156.7.
- B. Quantity: Provide the following, unless otherwise indicated:
 - 1. Two (2) Hinges: For door with heights up to 60 inches.
 - 2. Three (3) Hinges: For doors with heights 61 to 90 inches.
 - a. Four (4) hinges for doors greater than 42 inches wide.
 - 3. Four (4) Hinges: For doors with heights 91 to 120 inches.
 - 4. For doors with heights more than 120 inches, provide four (4) hinges, plus one (1) hinge for every 30 inches of door height greater than 120 inches.
 - 5. Four (4) Hinges: For Dutch doors, two (2) per leaf.
- C. Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required.
 - 1. Door Size: 36 by 96 by 1-3/4 inches; 4-1/2 inch hinge height; Standard Weight, 0.134 inch thick; Heavy Weight, 0.180 inch thick.
 - 2. Door Size: 42 by 96 by 1-3/4 inches; 4-1/2 inch hinge height; Standard Weight, 0.134 inch thick; Heavy Weight, 0.180 inch thick.
 - 3. Door Size: 48 by 120 by 1-3/4 inches; 5 inch hinge height, Standard Weight, 0.146 inch thick; Heavy Weight, 0.190 inch thick.

2.3 HINGES

- A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - a. Ives Hardware: Basis of Design.
 - b. Equal products manufactured by McKinney may be used.
- B. Antifriction-Bearing Hinges:
 - 1. Product: 5BB1
 - 2. Exposure: A5112.
 - 3. Mounting: Full mortise (butts).
 - 4. Bearing Material: Ball bearing.
 - 5. Grade: Grade 2 (standard weight).
 - 6. Base and Pin Metal:
 - a. Exterior Hinges: Stainless-steel pin body and stainless-steel pins.
 - b. Interior Hinges: Steel pin body and steel pins.

7. Finishes:
 - a. Exterior Hinges: US32D/630.
 - b. Interior Hinges: US26D/652.
 8. Pins: Non-rising loose unless otherwise indicated.
 - a. Out-swinging Exterior Doors: Non-removable.
 9. Tips: Flat button.
 10. Corners: Square.
- C. Plain-Bearing Hinges: Grade 3 (standard weight).
1. Product: 5PB1.
 2. Exposure: A8133
 3. Mounting: Full mortise (butts).
 4. Base and Pin Metal: Steel pin body and steel pins.
 5. Pins: Non-rising loose unless otherwise indicated.
 6. Tips: Flat button.
 7. Corners: Square.
 8. Finish:
 - a. Exterior Hinges: US32D/630.
 - b. Interior Hinges: US26D/652.
- 2.4 MECHANICAL LOCKS AND LATCHES
- A. Lock Functions: As indicated in Door Hardware Schedule.
- B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
1. Bored Locks: Minimum 1/2-inch (13 mm) latchbolt throw.
- C. Lock Backset: 2-3/4 inches (70 mm), unless otherwise indicated.
1. Levers: Cast.
 - a. Bored Locks: Monroe (MO).
 - b. Mortise Locks: Monroe (MO x CH).
 2. Escutcheons: Wrought.
 - a. Bored Locks: Standard Rose
 - b. Mortise Locks: CN, Full Face, Cold Forged Brass.
 3. Operating Device: Lever with escutcheons (Roses or Full-Faced).
- D. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.
1. Flat-Lip Strikes: For locks with three (3)-piece antifriction latchbolts, as recommended by manufacturer.
 2. Strike Box: Manufacturers standard strike/dust box matching strike plate.

- E. Bored Locks: BHMA A156.2; Grade 2; Series 4000.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - a. Yale: 4600 LN Series.
 - b. Equal products manufactured by Schlage may be used.
 - 2. Functions:
 - a. Passage: 4601 LN (F75).
 - b. Lockset: 4607 LN (F109).
 - c. Bath Privacy Lock: 4602 LN (F76A).
 - d. Storeroom Lock: 4605LN (F86).
 - 3. Finishes: All visible lock parts and trim, US10B.
- F. Mortise Locks: BHMA A156.13; Grade 1; Series 1000.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - a. Yale: 8800 Series.
 - b. Equal products manufactured by Schlage may be used.
 - 2. Functions:
 - a. Storeroom Lock: 8805 (F07).
 - b. Entry Lock: 8807 (F04).
 - 3. Finishes: All visible lock parts and trim, US32D/630.

2.5 FLUSH BOLTS

- A. Manual Flush Bolts: BHMA Grade 1.
 - 1. Type: Lever extension flush bolt.
 - 2. Quantity: Two (2) per leaf.
 - 3. Accessories: Provide rods, brackets, guides and strikes.
 - a. 12 inch rod length at bottom of doors.
 - b. 29 inch rod length at top of door.
 - c. Dustproof strikes at floor strikes.
 - 4. Base Material: Extruded brass.
 - 5. Finish: 26D.
 - 6. Style: Rockwood 550.

2.6 EXIT DEVICES AND AUXILIARY ITEMS

- A. Exit Devices and Auxiliary Items: BHMA A156.3. Grade 1.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - a. Von Duprin: 98 Series.

- b. Substitutions will not be allowed.
- B. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
- C. Fire Exit Devices: Devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.
- D. Exit Device Type 2 - Rim Exit Device :
 - 1. Product: 98 L.
 - 2. Type: 1.
 - 3. Grade: Grade 1.
 - 4. Actuating Bar: Push pad.
 - 5. Trim: 996L with 07 lever.
 - 6. Function: ANSI 08 – Push pad retracts latch; key retracts latch; key locks or unlocks lever; less dogging.
 - 7. Finish: US26D/US32D.
- E. Exit Device Type 3 -. Rim Exit Device :
 - 1. Product: 98 EO.
 - 2. Grade: Grade 1.
 - 3. Actuating Bar: Push pad.
 - 4. Function: ANSI 01 Exit Only – Push pad retracts latch; less dogging.
 - 5. Finish: US26D/US32D.

2.7 LOCK CYLINDERS AND KEYING

- A. Manufacturers: Provide cylinders from the same manufacturer as locksets.
- B. Standards: Comply with the following:
 - 1. Cylinders: BHMA A156.
 - 2. Cylinder Grade: BHMA Grade 1.
- C. Cylinders: Manufacturer's standard tumbler type, constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:
 - 1. Number of Pins: Six (6).
 - 2. Mortise Type: Threaded cylinders with rings and straight- or clover-type cam.
 - a. BHMA Designation EO9211
 - 3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
 - a. BHMA Designation E09231:
- D. Permanent Cores: Manufacturer's standard; finish face to match lockset; complying with the following:
 - 1. Interchangeable Cores: Core insert, removable by use of a special key, and usable with other manufacturers' cylinders.

- E. Keying System: Unless otherwise indicated, provide a factory-registered keying system complying with the following requirements:
 - 1. Master Key System: Cylinders are operated by a change key and a master key as follows:
 - a. Change Key: Individual keys for individual locks.
 - b. Exterior Door Keys: Key exterior doors.
 - c. Maintenance Master: Opens all mechanical, electrical and equipment room doors.
 - d. Grand Master: Opens every door.
- F. Keys: Provide nickel-silver keys complying with the following:
 - 1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
 - a. Notation: "DO NOT DUPLICATE."
 - 2. Quantity: In addition to one extra blank key for each lock, provide the following:
 - a. Cylinder Change Keys: Three (3).
 - b. Master Keys: Five (5) each.
 - c. Exterior Door Keys: Ten (10) each.
 - d. Maintenance Master: Ten (10).

2.8 STRIKES

- A. Standards: Comply with the following:
 - 1. Strikes for Bored Locks and Latches: BHMA A156.2.
 - 2. Strikes for Mortise Locks and Latches: BHMA A156.13.
 - 3. Strikes for Interconnected Locks and Latches: BHMA A156.12.
 - 4. Strikes for Auxiliary Deadlocks: BHMA A156.5.
- B. 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 (3)-piece antifriction latchbolts, as recommended by manufacturer.
- C. Electric Strikes: Provide medium-duty, fail-secure, electric strike for use with Mortis or cylindrical locksets and compatible with rim exit devices.
 - 1. Product: Von Duprin 5100-3FP
 - 2. Standards: ANSI/BHMA 156.5; UL 1034
 - 3. Finish: Aluminum
 - 4. Input Voltage: 12/24 V AC/DC

2.9 OPERATING TRIM, GENERAL

- A. Manufacturers: Subject to compliance with requirements, provide products by manufacturer listed for each product or equal products by other manufacturer.

- B. Standard: Comply with BHMA A156.6.

2.10 OPERATING TRIM

- A. Flat Push Plates: 0.050 inch thick, 4 inches wide by 16 inches high; with square corners and beveled edges, secured with exposed screws.
 - 1. Product: Rockwood 70C-RKW.
 - 2. Finish: US32D.
- B. Flat Kick Plate: 0.050 inch thick, 10 inches high by 2 inches less than door widths, with square corners and beveled edges, secure with exposed screws.
 - 1. Product: Rockwood K1050.
 - 2. Finish: US32D.
- C. Tubular Door Pulls: 1-1/4 inch diameter pull.
 - 1. Product: Rockwood RM301.
 - 2. Length: 12 inch long, 3 inch projection.
 - 3. Back Plate: 0.650 inch, 4 inch wide by 16 inch high with square corners.
 - 4. Pull Position: Plain, centered.
 - 5. Finish: US32D.
- D. Surface Bolts:
 - 1. Rockwood: 580-8
 - 2. Length: 8 inches.
 - 3. Finish: US26D.

2.11 SURFACE CLOSERS

- A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - a. Yale.
- B. Closer – Type 2: Closer with Cover: Grade 1; Modern Type with mechanism enclosed in cover.
 - 1. Product: Series 5800.
 - 2. Mounting: Parallel arm, push side, on door.
 - 3. Type: Normal power range, adjustable strikes 1-6.
 - 4. Backcheck: Adjustable, effective between 60 and 90 degrees of door opening.
 - 5. Cover Material: Molded plastic.
 - 6. Finish: 689 Aluminum painted.
 - 7. Closing Power Adjustment: At least 15 percent more than minimum tested value.

- C. Closer – Type 3: Closer with Cover: Grade 1; Modern Type with mechanism enclosed in cover.
 - 1. Product: Series 5821.
 - 2. Mounting: Parallel arm, push side, on door.
 - 3. Type: Normal power range, adjustable strikes 1-6.
 - 4. Backcheck: 110 degree hold-open capability.
 - 5. Cover Material: Molded plastic,
 - 6. Finish: 689 Aluminum painted.
 - 7. Closing Power Adjustment: At least 15 percent more than minimum tested value.

2.12 MECHANICAL STOPS AND HOLDERS

- A. Wall- and Floor-Mounted Stops: BHMA A156.16; polished cast brass, bronze, or aluminum base metal.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - a. Rockwood.
 - 2. Provide wall bumpers whenever practical. Provide floor stops when wall stops are not appropriate.
- B. Dome-Type Floor Stop: Grade 2; with minimum 1-1/8 inch (29 mm) high bumper for doors without threshold and 1-1/2 inch (38 mm) high bumper for doors with threshold; provide with extruded aluminum riser for carpet installations.
 - 1. Product: 441CU, US26D.
- C. Wall Bumpers: Grade 2; with rubber bumper; 1-7/8 inch (48 mm) diameter, minimum 1 inch (25 mm) projection from wall; with backplate for concealed fastener installation; with concave bumper configuration.
 - 1. Product: 426, US26D.
- D. Exterior Floor Stop: Cast brass construction with replaceable rubber tip.
 - 1. Product: FS470.
 - a. Height: 3 inch (76 mm).
 - b. Finish: US26D.
- E. Silencers for Metal Door Frames: BHMA Grade 1; neoprene or rubber, minimum diameter 1/2 inch; fabricated for drilled-in application to frame.
 - 1. Provide on all interior hollow metal door frames.
- F. Overhead Surface-Mounted, Non-friction Slide Stops: Type 5; Grade 1; with non-frictional element held under adjustable pressure and shock absorber; for single-acting doors opening 110 degrees.

2.13 DOOR GASKETING – WEATHER SEALS

- A. Door Gasketing: BHMA A156.22; air leakage not to exceed 0.50 cfm per foot (0.000774 cu. m/s per m) of crack length for gasketing other than for smoke control, as tested according to ASTM E 283; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - a. Pemco.
- B. Weather Seals: Double perimeter seals mounted to door jamb and head:
 - 1. Inboard Seals: Adhesive-Backed Perimeter Gasketing; Silicone, triple fin adhesive perimeter seal applied to frame rabbet with self-adhesive.
 - a. Product: S88 BL.
 - 2. Outboard Seals: Bronze Spring seal.
 - a. Product: 75 B.
- C. Door Sweeps: Vinyl gaskets. Gasket material held in place by flat aluminum housing or flange; surface mounted to door with screws.
 - 1. Outside Sweep with Rain Drip:
 - a. Product: 345_PK D.
 - b. Mount on outside face of door so that sweep engages the threshold when closed.
- D. Overhead Rain Drip:
 - a. Manufactures standard rain drip.
 - b. 4 inches longer than door width.
 - c. Color to match door and frame color

2.14 DOOR GASKETING – SOUND SEALS

- A. Sound Seals: Double perimeter seals mounted to door jamb and head:
 - 1. Inboard Seals: Adhesive-Backed Perimeter Gasketing; Silicone, triple fin adhesive perimeter seal applied to frame rabbet with self-adhesive.
 - a. Product: S88B.
 - 2. Outboard Seals: Surface mounted seal.
 - a. Product: 312 R.
 - b. Attach to door stop with door closing against bulb.
- B. Automatic Door Bottom: Aluminum body with adjustable neoprene seal. Recess into bottom of door so that the seal is in contact with the threshold when closed.
 - 1. Product: STC411 PK.

2.15 ASTRAGALS

- A. Astragal for exterior pairs of doors: Overlapping-with-Gasket Astragal. Surface mounted on face of active leaf:
 - 1. Product: 355-S.
 - 2. Base Metal: Aluminum.
 - 3. Gasket Material: Neoprene bulb and lip.

2.16 THRESHOLDS

- A. Thresholds: Fabricated to full width of opening indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - a. Pemco.
- B. Saddle Threshold with Gasket: Fluted-top metal member with gasket.
 - 1. Type: Concealed fastener.
 - 2. Size: 5 inch by 1/2 inch high.
 - 3. Base Metal: Aluminum.
 - 4. Gasket Material: Neoprene bulb.
 - 5. Required undercut: min. 9/32", max 15/32"
 - 6. Product: 2009_PK D.

2.17 FABRICATION

- A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rated labels and as otherwise approved by Architect.
 - 1. Manufacturer's identification is permitted on rim of lock cylinders only.
- B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.
- C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
 - 1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
 - 2. Fire-Rated Applications:
 - a. Wood or Machine Screws: For the following:

- 1) Hinges mortised to doors or frames; use threaded-to-the-head wood screws for wood doors and frames.
 - 2) Strike plates to frames.
 - 3) Closers to doors and frames.
- b. Steel Through Bolts: For the following unless door blocking is provided:
- 1) Surface hinges to doors.
 - 2) Closers to doors and frames.
 - 3) Surface-mounted exit devices.
3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
 4. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors".
 5. Gasketing Fasteners: Provide non-corrosive fasteners for exterior applications and elsewhere as indicated.

2.18 FINISHES

- A. Provide finishes complying with BHMA A156.18 as indicated in Door Hardware Schedule.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 2. Custom Steel Doors and Frames: HMMA 831.
 3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors".

- B. Install each door hardware item to comply with manufacturer's 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. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- C. Hinges: Install types and in quantities indicated in Door Hardware Schedule but not fewer than the number recommended by manufacturer for application indicated or one (1) hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- D. Lock Cylinders: Install construction cores to secure building and areas during construction period.
 - 1. Replace construction cores with permanent cores as indicated in keying schedule.
 - 2. Furnish permanent cores to Owner for installation.
- E. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings. Verify location with Architect.
 - 1. Configuration: Provide least number of power supplies required to adequately serve doors with electrified door hardware.
- F. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 07 92 00 "Joint Sealants".
- G. Stops: Provide floor stops for doors unless wall or other type stops are indicated in Door Hardware Schedule. Do not mount floor stops where they will impede traffic.
- H. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- I. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- J. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.3 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.
 - 1. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.
 - 2. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

3.4 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

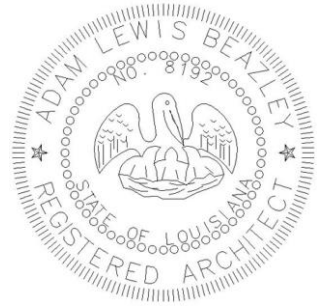
3.5 HARDWARE SCHEDULE

A. GENERAL

- 1. The following Schedule is for Contractor's guidance in determining the class and quantity of hardware desired for the work. The Contractor is responsible for providing all hardware necessary for a complete and functional operation. If any hardware is not scheduled, it shall be similar to that shown in similar locations and shall be furnished with no additional cost to the Owner.
- 2. Hardware for doors indicated shall be furnished in accordance with the Schedule below.
 - a. Quantity indicated is for each set. Complete sets shall be furnished for each door listed for that set.
 - b. Contractor shall furnish all items or components of hardware required for completion of work and to make installation operable.
 - c. Catalog numbers given herein are to identify in general the functions, style and finishes of hardware desired. They are not complete and are not intended for ordering materials. Contractor shall be responsible for providing hardware appropriate for installations.

END OF SECTION 08 71 11

SECTION 08 80 00 - GLAZING



PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Glass.
- B. Glazing compounds and accessories.

1.2 RELATED REQUIREMENTS

- A. Section 07 90 00 – “Joint Sealant” Sealant and back-up material.
- B. Section 08 14 16 – “Flush Wood Doors” Glazed lites in wood doors.
- C. Section 08 41 13 – “Aluminum Framed Entrances and Storefront” Gaskets for Glazing in aluminum framed glass doors.

1.3 SUBMITTALS

- A. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
- B. Product Data on Glazing Compounds: Provide chemical, functional and environmental characteristics, limitations, special application requirements. Identify available colors.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA Glazing Manual and GANA Sealant Manual for glazing installation methods.

1.5 FIELD CONDITIONS

- A. Do not install glazing when ambient temperature is less than 50 degrees F.
- B. Maintain minimum ambient temperature before, during and twenty-four (24) hours after installation of glazing compounds.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS, GENERAL

- A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.

- 1. Minimum Glass Thickness for Exterior Lites: Not less than 6 mm.

- B. Strength: Where float is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass as needed to comply with "Performance Requirement" Article. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.

2.2 GLASS PRODUCTS

- A. Annealed Float Glass: ASTM C 1036, Type I (transparent flat glass), Quality-Q3; of class indicated.
- B. Heat-Treated Float Glass: ASTM C 1048; Type I (transparent flat glass); Quality-Q3; of class, kind, and condition indicated.
 - 1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed, unless otherwise indicated.
 - 2. Provide Kind HS (heat-strengthened) float glass in place of annealed float glass where needed to resist thermal stresses induced by differential shading of individual glass lites and to comply with glass design requirements specified in Part 1 "Performance Requirements" Article.
 - 3. For uncoated glass, comply with requirements for Condition A.
 - 4. For coated vision glass, comply with requirements for Condition C (other uncoated glass).
 - 5. Provide Kind FT (fully tempered) float glass in place of annealed or Kind HS (heat-strengthened) float glass where safety glass is required by ANSI regulations.

2.3 LAMINATED GLASS

- A. Laminated Glass: ASTM C 1172, and complying with testing requirements in 16 CFR 1201 for Category II materials, and with other requirements specified. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
 - 1. Construction: Laminate glass with polyvinyl butyral interlayer or cast-in-place and cured-transparent-resin interlayer to comply with interlayer manufacturer's written recommendations.
 - 2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
 - 3. Interlayer Color: As indicated for each glass unit type.
- B. Glass: Comply with applicable requirements in "Glass Products" Article as indicated by designations in "Laminated Glass Types" Article.

2.4 FLOAT GLASS UNITS:

- A. Clear float glass (**G-1**).
 - 1. Thickness: 1/4 inch (6 mm).
 - 2. Provide Kind FT (fully tempered) float glass in place of annealed where safety glass is required by ANSI regulations.
 - 3. Class 1 (clear) float glass.

2.5 INSULATING-GLASS UNITS

A. Manufacturer:

1. Basis of Design: Vitro Architectural Glass

B. Passive Solar Low-E Insulating-Glass Units (IG):

1. Product Description: 1" Insulating unit
2. Overall Unit Thickness: 1 inch (25 mm).
3. Inter-space Content: Manufacturer's standard
4. Outdoor Lite: "Solexia" Glass by Vitro Architectural Glass, Sputter Coated on second surface (2)
5. Indoor Lite: Clear (transparent) Float Glass
6. Low-E Coating: "Solarban" 70 Solar Control (Sputtered)
 - a. Location: Second Surface (2)
7. Performance:
 - a. Visible Light Transmittance: 58%.
 - b. Outdoor Visible Light-Exterior Reflectance: 11%.
 - c. Winter NFRC U-Value: 0.28 Btu/(hr. x sq.ft. x deg. F).
 - d. Summer NFRC U-Value: 0.26 Btu/(hr. x sq.ft. x deg. F).
 - e. Solar heat Gain Coefficient (SHGC): 0.26.
 - f. Shading Coefficient: 0.29

2.6 EXTERIOR GLAZING ASSEMBLIES

A. Performance Criteria: Select type and thickness of glass to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of glass.

1. Use the procedure specified in ASTM E1300 to determine glass type and thickness.
2. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.
3. Glass thicknesses listed are minimum.

2.7 GLAZING COMPOUNDS

A. Manufacturers:

1. Bostik Inc: www.bostik-us.com.
2. Momentive Performance Materials, Inc. (formerly GE Silicones): www.momentive.com.
3. Pecora Corporation: www.pecora.com.
4. BASF Construction Chemicals-Building Systems: www.buildingsystems.basf.com.
5. At impact resistant exterior storefront and door systems, provide the Manufacturer's recommended product which was incorporated into impact test assemblies where in compliance with the requirements.
6. Substitutions: Refer to Section 01 60 00 – Product Requirements.

- B. Polyurethane Sealant: Single component, chemical curing, non-staining, non-bleeding ASTM C920, Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 20 to 35; color as selected.
- C. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining ASTM C 920, Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.

2.8 GLAZING ACCESSORIES

- A. Setting Blocks: Neoprene 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.
- B. Spacer Shims: Neoprene 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long x 1/2 the height of the glazing stop x thickness to suit application, self-adhesive on one (1) face.
- C. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option I; match color to Architect's selection.
- D. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned gaskets of material indicated below; complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal:
 - 1. EPDM.
 - 2. Silicone.
 - 3. Thermoplastic polyolefin rubber.
- E. Glazing Clips: Manufacturer's standard type.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that openings for glazing are correctly sized and within tolerance.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.2 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. Prime surfaces scheduled to receive sealant.
- C. Install sealants in accordance with ASTM C1193 and GANA Sealant Manual.
- D. Install sealants in accordance with manufacturer's instructions.

3.3 INSTALLATION – EXTERIOR/INTERIOR DRY METHOD (GASKET GLAZING)

- A. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- B. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- C. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.
- D. Utilize Silicone type sealant at interior side of exterior storefront where required to meet performance requirements.

3.4 INSTALLATION – EXTERIOR WET METHOD (SEALANT AND SEALANT)

- A. For use at Glass in Wood Doors.
- B. Place setting blocks at 1/4 points and install glazing pane or unit.
- C. Install stops with glazing centered in space by inserting spacer shims both sides at 24 inch intervals, 1/4 inch below sight line.
- D. Fill gaps between glazing and stops with silicone type sealant to depth of bite on glazing, but not more than 3/8 inch below sight line to ensure full contact with glazing and continue the air and vapor seal.
- E. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.5 FIELD QUALITY CONTROL

- A. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
- B. Monitor and report installation procedures and unacceptable conditions.

3.6 CLEANING

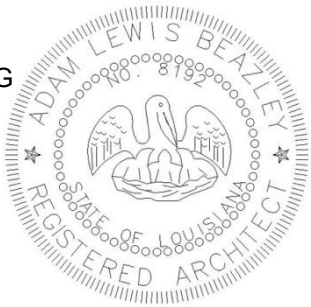
- A. Remove glazing materials from finish surfaces.
- B. Remove labels after Work is complete.
- C. Clean glass and adjacent surfaces.

3.7 PROTECTION

- A. After installation, mark pane with an "X" by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.
- B. Protect applied plastic film from damage during subsequent construction.

END OF SECTION 08 80 00

SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING



PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Non-load-bearing steel framing systems for interior gypsum board assemblies.
 - 2. Suspension systems for interior gypsum ceilings, soffits and acoustic panels.
- B. Related Requirements:
 - 1. Section 09 29 00 "Gypsum Board".

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For dimpled steel studs and runners, from ICC-ES.

PART 2 - PRODUCTS

2.1 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
 - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
 - 2. Protective Coating: Coating with equivalent corrosion resistance of ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized unless otherwise indicated.
- B. Studs and Tracks: ASTM C 645. Use either steel studs and tracks or dimpled steel studs and tracks.
 - 1. Steel Studs and Tracks:
 - a. Minimum Base-Metal Thickness: 0.018 inch.
 - b. Depth: As indicated on Drawings.
 - 2. Dimpled Steel Studs and Tracks:

- a. Minimum Base-Metal Thickness: 0.015 inch.
 - b. Depth: As indicated on Drawings.
- 3. Slip-Type Head Joints: At all interior non-load bearing walls, provide one (1) of the following to allow for minimum 3/4 inches of movement:
 - a. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and width to accommodate depth of studs.
 - b. Single Long-Leg Track: Track complying with the AISI North American Standard for Cold-Formed Steel Framing with 2 inch deep flanges in thickness not less than indicated for studs, installed with studs friction-fit into top track and with continuous bridging located within 12 inches of the top studs to provide lateral bracing.
 - c. Double-Track System: Track complying with AISI North American Standard for Cold-Formed Steel Framing, inside track with 2 inch deep flanges in thickness not less than indicated for studs and fastened to studs, and outer track sized to friction fit inside track.
- C. Flat Strap and Backing Plate.
 - 1. Sheet steel for blocking and bracing in length and width indicated.
 - 2. Minimum base steel thickness is 0.018 inch.
- D. Cold-Rolled Channel Bridging: Steel, 0.053 inch minimum base-metal thickness, with minimum 1/2 inch wide flanges.
 - 1. Depth: 1-1/2 inches.
 - 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068 inch thick, galvanized steel.
- E. Hat-Shaped, Rigid Furring Channels: ASTM C 645.
 - 1. Minimum Base-Metal Thickness: 0.018 inch.
 - 2. Depth: 7/8 inch.
- F. Cold-Rolled Furring Channels: 0.053 inch uncoated-steel thickness, with minimum 1/2 inch wide flanges.
 - 1. Depth: 3/4 inch.
 - 2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum uncoated-steel thickness of 0.033 inch.
 - 3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062 inch diameter wire, or double strand of 0.048 inch diameter wire.
- G. Z-Shaped Furring: With slotted or non-slotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum uncoated-metal thickness of 0.018 inch, and depth required to fit insulation thickness indicated.

2.2 SUSPENSION SYSTEMS

- A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062 inch diameter wire, or double strand of 0.048 inch diameter wire.

- B. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.
- C. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.053 inch and minimum 1/2 inch wide flanges.
 - 1. Depth: 2-1/2 inches.
- D. Furring Channels (Furring Members):
 - 1. Cold-Rolled Channels: 0.053 inch uncoated-steel thickness, with minimum 1/2 inch wide flanges, 3/4 inch deep.
 - 2. Steel Studs and Runners: ASTM C 645.
 - a. Minimum Base-Metal Thickness: 0.018 inch.
 - b. Depth: As indicated on Drawings.
 - 3. Dimpled Steel Studs and Runners: ASTM C 645.
 - a. Minimum Base-Metal Thickness: 0.015 inch.
 - b. Depth: As indicated on Drawings.
 - 4. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.
 - a. Minimum Base-Metal Thickness: 0.018 inch.

2.3 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
 - 1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Isolation Strip at Exterior Walls: Provide one (1) of the following:
 - 1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), non-perforated.
 - 2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Suspended Assemblies: Coordinate installation of suspension systems with installation into existing overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

3.3 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
 - 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- C. Install bracing at terminations in assemblies.
- D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
 - 1. Single-Layer Application: 24 inches o.c. unless otherwise indicated.
 - 2. Multilayer Application: 24 inches o.c. unless otherwise indicated.
- B. Where studs or furring channels are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
- C. Install studs so flanges within framing system point in same direction.
- D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.
 - 1. Slip-Type Head Joints: where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies due to deflection of structure.
 - 2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 - a. Install two studs at each jamb unless otherwise indicated.
 - 3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
 5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
 6. Curved Ceilings:
 - a. Bend curved supports to uniform curve and locate straight lengths so they are tangent to arcs.
 - b. Begin and end each arc with a support, and space intermediate supports equally along arcs. On straight lengths of no fewer than two (2) supports at ends of arcs, place studs 6 inches o.c.
- E. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

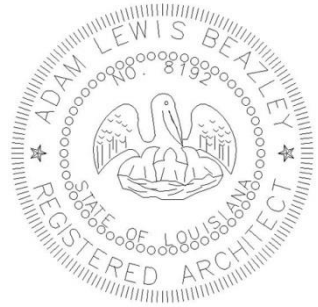
3.5 INSTALLING SUSPENSION SYSTEMS

- A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
1. Hangers: 48 inches o.c.
 2. Carrying Channels (Main Runners): 48 inches o.c.
 3. Furring Channels (Furring Members): 16 inches o.c.
- B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.
- C. Suspend hangers from building structure as follows:
1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
 - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
 - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
 3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
 4. Do not attach hangers to steel roof deck.
 5. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
 6. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
 7. Do not connect or suspend steel framing from ducts, pipes, or conduit.

- D. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 09 22 16

SECTION 09 29 00 - GYPSUM BOARD



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. Interior gypsum board.
 - 2. Cementitious Backer Units
- B. Related Requirements:
 - 1. Section 09 22 16 "Non-Structural Metal Framing" for non-structural framing and suspension systems that support gypsum board panels.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

- A. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:

- 1. CertainTeed Corporation.
- 2. Georgia-Pacific Building Products.
- 3. National Gypsum Company.
- 4. United States Gypsum Company.

- B. Gypsum Wallboard: ASTM C 1396/C 1396M.

- 1. Thickness: 5/8 inch (15.9 mm).
- 2. Long Edges: Tapered.

- C. Gypsum Board, Type X: ASTM C 1396/C 1396M.

- 1. Thickness: 5/8 inch (15.9 mm).
- 2. Long Edges: Tapered.

- D. Gypsum Ceiling Board: ASTM C 1396/C 1396M.

- 1. Thickness: 5/8 inch (15.9 mm).
- 2. Long Edges: Tapered.

- E. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.

- 1. Core: 5/8 inch (15.9 mm).
- 2. Long Edges: Tapered.
- 3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

- F. Cementitious Backer Units: ANSI A118.9 or ASTM C 1325, Type A, in maximum lengths available to minimize end-to-end butt joints.

- 1. Products: Subject to compliance with requirements, provide the following:

- a. United States Gypsum Company; Durock.
- b. National Gypsum Company; PermaBase Cement Board

2. Thickness: 1/2 inch.

2.4 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
 1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
 2. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. Expansion (control) joint.

2.5 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
 1. Interior Gypsum Board: Paper.
- C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 3. Fill Coat: For second coat, use drying-type, all-purpose compound.
 4. Finish Coat: For third coat, use drying-type, all-purpose compound.
 5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.

2.6 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
 2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panel's not less than one (1) framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
 - 2. Fit gypsum panels around ducts, pipes and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4 to 3/8 inch wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4 to 1/2 inch wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- I. Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members or provide control joints to counteract wood shrinkage.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Wallboard Type: Vertical surfaces unless indicated otherwise.
2. Type X: Where required for fire-resistance-rated assembly.
3. Ceiling Type: Ceiling surfaces.
4. Moisture- and Mold-Resistant Type: Walls within 10 feet of a water source that are not indicated to receive tile.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one (1) framing member in alternate courses of panels.
 - b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying face layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one (1) stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one (1) furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

3.4 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners.
2. LC-Bead: Use at exposed panel edges.

3.5 FINISHING GYPSUM BOARD

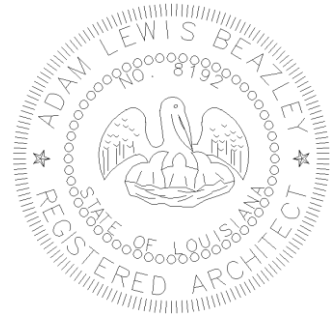
- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, rounded or beveled edges and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 - 1. Level 1: Ceiling plenum areas, concealed areas and where indicated.
 - 2. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
 - a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting and Finishing".
 - 3. Level 5: Where indicated on Drawings.
 - a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting and Finishing".

3.6 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged and mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 09 29 00

SECTION 09 30 00 - TILING



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. Porcelain Tile Pavers.
- B. Related Sections:
 - 1. Section 07 92 00 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.

1.3 DEFINITIONS

- A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
- B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in "American National Standard Specifications for Installation of Ceramic Tile".
- C. Module Size: Actual tile size plus joint width indicated.
- D. Face Size: Actual tile size, excluding spacer lugs.

1.4 PERFORMANCE REQUIREMENTS

- A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
 - 1. Level Surfaces: Minimum 0.40.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification:

1. Full-size units of each type and composition of tile and for each color and finish required.

1.6 QUALITY ASSURANCE

- A. Source Limitations for Tile: Obtain tile of each color or finish from one (1) source or producer.
 1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one (1) source or producer.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:
 1. Joint sealants.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
- D. Store liquid materials in unopened containers and protected from freezing.
- E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
 1. Provide tile complying with Standard grade requirements unless otherwise indicated.

- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

2.2 TILE PRODUCTS

- A. Porcelain Wall Tiles: ANSI A137-1, Standard Grade.

- 1. Tile Type: Factory-mounted unglazed wall tile.
 - a. Manufacturer: Emser Tile
 - b. Collection: Newport
 - c. Composition: Porcelain.
 - d. Module Size: 12 inches by 24 inches.
 - e. Face: Plain with products' standard edge.
 - f. Tile Color and Finish: Pier, Matt
 - g. Grout Color: As selected by Architect from manufacturer's full range.
 - h. Pattern: Ashlar, 1/3 overlap.

2.3 SETTING MATERIALS

- A. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.

- 1. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.

2.4 GROUT MATERIALS

- A. Standard Cement Grout: ANSI A118.6.

2.5 FINISHING AND EDGE-PROTECTION PROFILES FOR WALLS

- A. Schluter-JOLLY:
 - 1. Description: L-shaped profile with 1/8 inch (3.2 mm) wide top selection vertical wall section that together form the visible surface, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.
 - 2. Anchoring Leg:
 - a. Provide with straight anchoring leg.
 - 3. Material and Finish:
 - a. AT – Satin Nickel Anodized Aluminum.

- 1) Height as required to coordinate with tile selection and setting system selected.

2.6 ELASTOMERIC SEALANTS

- A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the following requirements and with the applicable requirements in Section 079200 "Joint Sealants."
 1. Use primers, backer rods, and sealant accessories recommended by sealant manufacturer.
- B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints unless otherwise indicated.
- C. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.

2.7 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, Portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.8 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
 2. Verify that concrete substrates for tile floors installed with thin-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
 - a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
 - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
 3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
 4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- B. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 TILE INSTALLATION

- A. Comply with TCA's "Handbook for Ceramic Tile Installation" for TCA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
 1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:
 - a. Tile floors in wet areas.
 - b. Tile floors composed of tiles 8 by 8 inches (200 by 200 mm) or larger.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

- D. Jointing Pattern: Lay tile in pattern indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
 - 1. Running Bond Pattern: Stagger joints one-third (1/3rd) tile overlap on successive joints.
 - 2. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- E. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
 - 1. Paver Tile: 1/16 inch (1.6 mm).

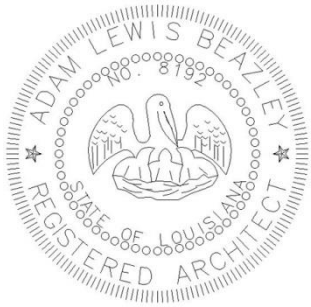
3.4 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 - 1. Remove latex-Portland cement grout residue from tile as soon as possible.
 - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than ten (10) days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
 - 3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.
- B. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- C. Prohibit foot and wheel traffic from tiled floors for at least seven (7) days after grouting is completed.
- D. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.5 INTERIOR TILE INSTALLATION SCHEDULE

- A. Interior Floor Installations, Concrete Subfloor:
 - 1. Tile Installation F113: Thin-set mortar; TCA F113.
 - a. Tile Type: Porcelain Tile Pavers (PT).
 - b. Thin-Set Mortar: Latex- Portland cement mortar.
 - c. Grout: Standard un-sanded cement grout.

END OF SECTION 09 30 00



SECTION 09 51 13 - ACOUSTICAL TILE CEILINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

1.2 RELATED REQUIREMENTS

- A. Section 08 31 00 – “Access Doors and Panels”: Access panels.

1.3 SUBMITTALS

- A. Shop Drawings: Indicate grid layout and related dimensioning.
- B. Product Data: Provide data on suspension system components and acoustical units.
- C. Samples: Submit two (2) full size samples illustrating material and finish of acoustical units.
- D. Samples: Submit two (2) samples each, 12 inches long, of suspension system main runner.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of Project.
 - 1. Extra Suspension Systems: One (1) unopened box of suspension system material.
 - 2. Extra Acoustical Units: Not less than three (3) unopened cartons of acoustical ceiling materials.

1.4 FIELD CONDITIONS

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

1.5 WARRANTY

- A. Ceiling Panels: Warrant ceiling panels to be free from sagging, warping, shrinking, buckling or delaminating as a result of manufacturing defects for a period of one (1) year from the date of Substantial Completion.
- B. Suspension System: Warrant suspension system to be free from defects in material or factory workmanship for a period of ten (10) years from the date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acoustic Tiles:
 - 1. Armstrong World Industries, Inc.; www.armstrong.com.
 - 2. CertainTeed Corporation; www.certainteed.com.
 - 3. USG; www.usg.com.
- B. Suspension Systems:
 - 1. Same as for acoustical units.

2.2 ACOUSTICAL UNITS

- A. Acoustical Units - General: ASTM E1264, Class A.
- B. Acoustical Tile Type ACT-1: Painted mineral fiber, ASTM E 1264, Type III, Form 2 , Pattern CE with the following characteristics:
 - 1. Size: 24 by 24 inches.
 - 2. Thickness: 5/8 inch.
 - 3. Composition: Water felted.
 - 4. Light Reflectance: 82 percent, determined in accordance with ASTM E1264.
 - 5. NRC: 0.55, determined in accordance with ASTM E1264.
 - 6. Edge: Beveled tegular 15/16 inch.
 - 7. Surface Color: White.
 - 8. Surface Pattern: CE.
 - 9. Mold/Mildew Inhibitor: Manufacturer's anti-microbial treatment in accordance with ASTM D3273.
 - 10. Basis-of-Design Products:
 - a. Armstrong World Industries; 1494 Canyon Beveled Tegalay Lay-In with 15/16 inch suspension system.

2.3 SUSPENSION SYSTEM(S)

- A. Manufacturers:
 - 1. Same as for acoustical units.
- B. Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.
 - 1. Recycled Content: Post-consumer recycled content plus one-half pre-consumer recycled content not less than 25 percent.
- C. Exposed Steel Suspension System: Formed steel, commercial quality cold rolled; intermediate-duty.
 - 1. Profile: Tee; 15/16 inch wide face.
 - 2. Construction: Double web.
 - 3. Finish: White painted.
 - 4. Basis of Design: Armstrong Prelude XL 15/16 inch.

2.4 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.
- B. Perimeter Moldings: Same material and finish as grid.
 - 1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
 - 2. "Cloud" floating edging where indicated or where ceiling edge does not meet walls.
- C. Sound Attenuation Blankets: Un-Faced Fiberglass Sound Insulation.
 - 1. Size: 24 inches by 48 inches by 3-1/2 inches thick.
 - 2. Unfaced.
 - 3. Lay-in ceiling grid.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions before starting Work.
- B. Verify that layout of hangers will not interfere with other Work.

3.2 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Locate system on room axis according to reflected plan.
- D. Install after major above-ceiling Work is complete. Coordinate the location of hangers with other Work.
- E. Provide hanger clips during steel deck erection. Provide additional hangers and inserts as required.
- F. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- G. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- H. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

- I. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- J. Do not eccentrically load system or induce rotation of runners.
- K. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Use longest practical lengths.
 - 2. Overlap and rivet corners.
- L. Where cloud type ceilings are to be provided, do not install wire hangers closer than 8 inches from perimeter trim.

3.3 INSTALLATION - ACOUSTICAL UNITS

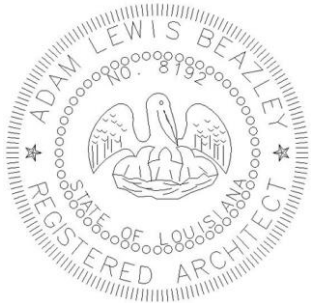
- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install units after above-ceiling work is complete.
- E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- F. Cutting Acoustical Units:
 - 1. Make field cut edges of same profile as factory edges.
- G. Where round obstructions occur, provide preformed closures to match perimeter molding.

3.4 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION 09 51 13

SECTION 09 65 00 - RESILIENT BASE



PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Resilient base.

1.2 SUBMITTALS

- A. Product Data: Submit technical data from each manufacturer of resilient products required.
- B. Initial Samples: Submit manufacturer's standard color selection samples for resilient products required, including all available colors and patterns.

1.3 QUALITY ASSURANCE

- A. Fire Performance Ratings: Provide products which have been tested and certified to comply with the following requirements:
 - 1. Critical Radiant Flux (CRF): ASTM E 648 or NFPA 253; minimum value as follows:
 - a. 0.45 watt per square centimeter.
 - 2. Smoke Density: ASTM E 662; maximum 450.

1.4 PROJECT CONDITIONS

- A. Environmental Requirements: At least forty-eight (48) hours prior to beginning Work, move resilient flooring materials to areas of installation and maintain at minimum 70 degrees F until forty-eight (48) hours after completing installation and at minimum 55 degrees F thereafter.
- B. Sequencing: Do not begin installation of resilient flooring products until painting has been completed for each area.

PART 2 - PRODUCTS

2.1 RESILIENT BASE MATERIALS

- A. Rubber Wall Base: RB

1. Manufacturer: Flexco.
2. Material: vulcanized rubber.
3. Height: 4 inches.
4. Style/Profile: Cove with toe.
5. Corners: Preformed or molded units matching base in color and finish.
6. Color: 07 Umber.

2.2 COLORS AND PATTERNS

- A. Reference drawings for colors and locations.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
 1. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
 2. Do not install resilient products until they are the same temperature as the space where they are to be installed.
 3. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Comply with manufacturer's published recommendations for installation in each area, extending resilient flooring into spaces which are partially concealed. Cut and fit tightly to fixtures, pipes, and other obstructions, as well as to walls and partitions.

3.3 INSTALLATION OF RESILIENT BASE

- A. Apply resilient base securely in locations indicated, using maximum lengths available.

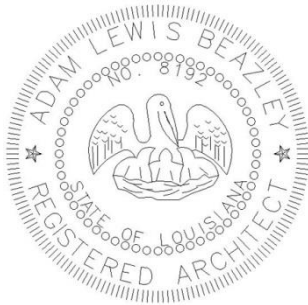
3.4 CLEANING

- A. Final Cleaning: Remove scuff marks, excess adhesive, and other foreign substances, using only cleaning products and techniques recommended by manufacturer of resilient products.

END OF SECTION 09 65 00

RESILIENT BASE

Section 09 65 00 –
Page 2



SECTION 09 65 19 - RUBBER TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Rubber floor tile.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For each type of floor tile. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
1. Show details of special patterns.
- C. Samples for Selection: 3 by 3 inch samples of full range of product colors for selection.
- D. Samples: Full-size units of each color and pattern of floor tile required.

1.3 CLOSEOUT SUBMITTALS

- A. Maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 RUBBER FLOOR TILE

- A. Manufacturer: Zandur Innovative Flooring, RB&G Products T/A Zandur. 12695 Lee Hwy. Washington, VA 22747. Ph: 888.397-2656. www.zandur.com
- B. Product: Techne rubber flooring.
1. Tile: Flooring shall be made of minimum SBR rubber and shall be colored throughout the tile with fade resistant pigments.
 2. Physical Properties:
 - a. Dimensions: 24 by 24 inches.
 - b. Standard Thickness: 4 mm.

- C. Wearing Surface: Textured.
- D. Colors and Patterns: Black.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland cement based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the work.
- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks and other imperfections, are smooth and level within tolerance specified by manufacturer and are free of oils, waxes, paint or other materials that might interfere with adhesion of resilient products.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Site Requirements:
 - 1. Do not sand, dry sweep, dry scrape, drill, saw, bead-blast, or mechanically chip or pulverize existing resilient flooring, backing, lining felt, asphalt "cutback" adhesive, or other adhesive. These products may contain asbestos fibers and/or crystalline silica. Avoid creating dust. Inhalation of such dust is a cancer and respiratory tract hazard. Smoking by individuals exposed to asbestos fibers greatly increases the risk of serious bodily harm. Unless positively certain that the product is a non-asbestos containing material, you must presume it contains asbestos. Regulations may require that the material be tested to determine asbestos content.
 - 2. Flooring must be installed on a substrate that is permanently dry, clean, smooth and structurally sound. It must be free of contaminants such as paint, oil, wax, mold, adhesive residues, sealers or any other materials that may interfere with adhesive bonding.
 - 3. Prior to installation, perform an adhesive bond test according to manufacturers current instructions.
 - 4. Flooring is not intended to be installed over existing floor coverings and is not warranted for such use unless approved by manufacturer. Existing flooring or Treads must be removed or (if installed on a wood subfloor) covered with 1/4" or 1/2" plywood.
 - 5. All Sub-floors shall be flat to within 3/16" in 10' and shall be patched or skim coated with a hard setting underlayment compound to ensure substrate is completely smooth. Cementitious underlayment compounds must have a minimum compressive strength of 3,000 psi. Do not apply patching material over existing adhesives. Manufacturer is not responsible for any claims submitted on floors where patching materials have been

applied over adhesive residue or existing floor coverings regardless of manufacturer instructions. After patching or skimming is complete, floor must be sanded or scraped to remove any trowel marks or other inconsistencies which may telegraph through the finished flooring material. Follow manufacturers guidelines for product mixing and use instructions. Gypsum products are not recommended for use.

B. Wood Substrates: Prepare according to ASTM F 710.

1. Floor covering products may be installed over 3/8" or greater A/C grade plywood or underlayment board such as Tecply or Halex (Arctic or Baltic Birch).
2. Products are not approved for installation over panel underlayments such as Masonite, luan, particle board, OSB, cementitious underlayment panel, wood underlayment with knots or coated wood.
3. Follow manufacturers' instructions for installation regarding fastening pattern and joint spacing. Do not install underlayment with screws.
4. Once installed, patch subfloor with cementitious material as instructed in current manufacturers' instructions.

C. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 10 pH.
4. Moisture Testing: Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations, but not less stringent than the following:
 - a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in twenty-four (24) hours.
 - b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level.

D. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

E. Do not install floor tiles until they are the same temperature as the space where they are to be installed.

F. Immediately before installation, sweep and vacuum clean substrates to be covered by rubber floor tile.

3.3 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

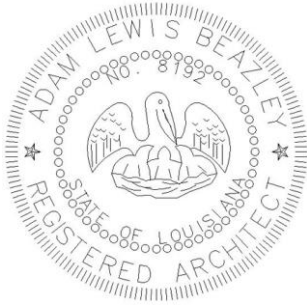
B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay tiles in an ashlar or staggered joint pattern.
- C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.
 1. Lay tiles with grain running in one (1) direction.
- D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.
- E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.
- H. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.
- B. Floor Sealer: Remove soil, adhesive, and blemishes from floor tile surfaces before applying liquid floor sealer.
 1. Johnson's Wax Carefree Matte Floor Finish (Carefree Matte)
 2. Apply three (3) coats.
- C. Cover floor tile until Substantial Completion.

END OF SECTION 09 65 19



SECTION 09 68 13 - TILE CARPETING

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 modular, fusion-bonded tufted carpet tile.
- B. Related Requirements:
 - 1. Section 09 65 00 "Resilient Base" for resilient wall base and accessories installed with carpet tile.

1.3 PREINSTALLATION MEETINGS

- A. Pre-installation Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to carpet tile installation including, but not limited to, the following:
 - a. Review delivery, storage, and handling procedures.
 - b. Review ambient conditions and ventilation procedures.
 - c. Review subfloor preparation procedures.
 - d. Review carpet layout and patterns.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
 - 2. Include installation recommendations for each type of substrate.
- B. Shop Drawings: Show the following:
 - 1. Carpet tile type and color.
 - 2. Pattern of installation.
 - 3. Pattern type, location, and direction.
 - 4. Type, color, and location of edge, transition, and other accessory strips.
 - 5. Transition details to other flooring materials.
- C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet Tile: Full-size sample.
2. Exposed Edge, Transition, and Other Accessory Stripping: 12 inch (300 mm) long Samples.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
 1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
 2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd. (8.3 sq. m).

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is experienced in the field of commercial carpet tile installation for a period of not less than ten (10) years.
- B. Fire-Test-Response Ratings: Where indicated, provide carpet tile identical to those of assemblies tested for fire response according to NFPA 253 by a qualified testing agency.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI 104.

1.10 FIELD CONDITIONS

- A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at occupancy levels during the remainder of the construction period.

- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.11 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
 - 2. Failures include, but are not limited to, more than 10 percent edge raveling, snags, runs, dimensional stability, excess static discharge, loss of tuft bind strength, loss of face fiber, and delamination.
 - 3. Warranty Period: Fifteen (15) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Provide products from manufacturers listed for each type of carpet tile.
- B. Subject to compliance to the provisions of the Contract Documents, equal products may be submitted for approval prior to bidding in accordance with the provisions of the Information for Bidders and Section 016000 – Product Requirements.

2.2 CARPET TILE (CPT-1)

- A. Products: Subject to compliance with requirements, provide the following:
 - 1. Basis of Design Manufacturer: EF Contract.
 - 2. Collection: Signet
 - a. Patterned Scroll.
 - b. TeraPlex SD PET, Solution Dyed.
 - c. Ounce Weight: 16 oz./sy.
 - d. Pile Thickness: 0.237 inches.
 - e. Color and Pattern: Slate SIG50.
 - f. Size: 24 inches by 24 inches.

2.3 CARPET TILE (CPT-2)

- A. Products: Subject to compliance with requirements, provide the following:
 - 1. Basis of Design Manufacturer: EF Contract.

2. Collection: Contact Sport
 - a. Tufted, phthalate-free.
 - b. Nylon w/ PROTEX, Solution Dyed.
 - c. Ounce Weight: 15 oz./sy.
 - d. Color and Pattern: Square Off CON56.
 - e. Size: 24 inches by 24 inches.

2.4 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, non-staining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.
 1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Edge/Transition Strips: Cover edge of carpet tile. Furnish profile and width and of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:
 1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet tile manufacturer.
 2. Subfloor finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" for slabs receiving carpet tile.
 3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.
- B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider and protrusions more than 1/32 inch (0.8 mm) unless more stringent requirements are required by manufacturer's written instructions.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet tile manufacturer.
- D. Clean metal substrates of grease, oil, soil and rust, and prime if directed by adhesive manufacturer. Rough sand painted metal surfaces and remove loose paint. Sand aluminum surfaces, to remove metal oxides, immediately before applying adhesive.
- E. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

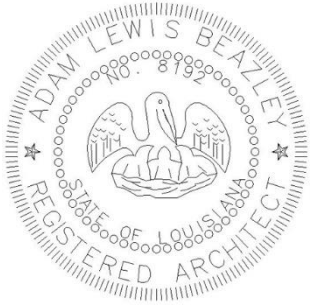
- A. General: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive.
- C. Maintain dye lot integrity. Do not mix dye lots in same area.
- D. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
- E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, non-staining marking device.
- G. Install pattern parallel to walls and borders.

3.4 CLEANING AND PROTECTION

- A. Perform the following operations immediately after installing carpet tile:
 - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
 - 2. Remove yarns that protrude from carpet tile surface.
 - 3. Vacuum carpet tile using commercial machine with face-beater element.

- B. Protect installed carpet tile to comply with CRI 104, Section 16, "Protecting Indoor Installations."
- C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 09 68 13



SECTION 09 81 00 - ACOUSTIC INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Glass-fiber board insulation.
 - 2. Glass-fiber blanket insulation.
 - 3. Mineral-wool blanket insulation.
- B. Related Sections:
 - 1. Division 07 Section "Penetration Firestopping" for insulation installed as part of a perimeter fire-resistive joint system.
 - 2. Division 09 Section(s) for installation in metal-framed assemblies of insulation specified by referencing this Section.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.

1.3 QUALITY ASSURANCE

- A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.1 GLASS-FIBER BLANKET INSULATION

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. CertainTeed Corporation.
 - 2. Johns Manville.
 - 3. Knauf Insulation.
 - 4. Owens Corning.

- B. Un-faced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

2.3 MINERAL-WOOL BLANKET INSULATION

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Fibrex Insulations, Inc.
 - 2. Owens Corning.
 - 3. Roxul Inc.
 - 4. Thermafiber.
- B. Un-faced, Mineral-Wool Blanket Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

2.4 INSULATION FASTENERS

- A. Insulation-Retaining Washers: Self-locking washers formed from galvanized-steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AGM Industries, Inc.; SC250.
 - b. Gemco; S-250.
 - c. Industrial Noise Control; INC Stick Pin.
 - 2. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in the following locations:
 - a. Crawl spaces.
 - b. Ceiling plenums.
 - c. Attic spaces.
 - d. Where indicated.
- B. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. AGM Industries, Inc.; TACTOO Adhesive.
 - b. Gemco; Tuff Bond Hanger Adhesive.
 - c. Industrial Noise Control; INC C-700.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of substances that are harmful to insulation or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.3 INSTALLATION OF GLASS-FIBER BLANKET INSULATION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Glass-Fiber Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
 - 1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
 - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
 - 3. Maintain 3 inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
 - 4. For metal-framed wall cavities where cavity heights exceed 96 inches, support un-faced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
 - 5. If wood-framed construction is encountered and insulation is required, install blankets according to ASTM C 1320 and as follows:
 - a. With faced blankets having stapling flanges, secure insulation by inset, stapling flanges to sides of framing members.
 - b. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.

3.4 INSTALLATION OF MINERAL WOOL SAFING INSULATION

- A. Mineral Wool Safing Insulation: Install safing insulation to pack voids created by wall intersections at beams and slabs or floor, ceiling and roof decks.

3.5 INSTALLATION OF INSULATION IN CEILINGS AND FLOATING FLOORS

- A. Where insulation is indicated for sound attenuation above ceilings, install Type 1 insulation over entire ceiling area in thicknesses indicated. Extend insulation 48 inches up either side of partitions.
- B. Where glass-fiber blankets are indicated for sound attenuation beneath floating floors, install Type 1 insulation between vibration isolation supports in floating floor assemblies.

3.6 INSTALLATION OF INSULATION IN MECHANICAL SPACES

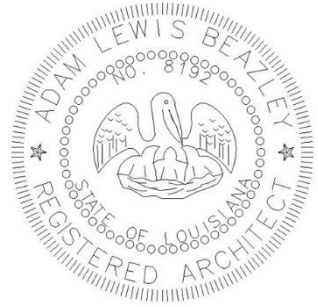
- A. Inside mechanical rooms install Type 3 insulation at all wall and ceiling surfaces, where possible, with fire-retardant adhesive and mechanical clips as follows:
 - 1. Apply fasteners 12 inches on center. Peel and press-type fasteners are not acceptable.
 - 2. Pins shall be cut off flush; washers shall be used and installation made so that no gaps or loose edges occur in the insulation.
 - 3. Apply a brush coat of hanger adhesive to washers, extending onto insulation surface a minimum of 2 inches.
 - 4. All transverse and longitudinal abutting edges of insulation shall be sealed and lapped 3 inches with a heavy coat of adhesive.

3.7 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 09 81 00

SECTION 09 84 36 – ACOUSTICAL WALL
UNITS AND SPEAKER GRILLES



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 shop-fabricated, fabric-wrapped panel units tested for acoustical performance, including:
 - 1. Sound-absorbing wall panels.
 - 2. Fabric-wrapped, perforated-metal speaker grilles.
- B. Related Requirements:
 - 1. Section 09 22 16 "Non-Structural Metal Framing" for requirements for metal suspension system.

1.3 DEFINITIONS

- A. NRC: Noise reduction coefficient.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, mounting, material descriptions, dimensions of individual components and profiles, and finishes for sound-absorbing wall units.
 - 2. Include furnished specialties and accessories.
- B. Shop Drawings: For sound-absorbing wall units.
 - 1. Include plans, elevations, sections, and mounting devices and details.
 - 2. Include details at joints and corners; and details intersections with walls. Indicate panel edge and core materials.
- C. Samples for Initial Selection: For each type of fabric facing from sound-absorbing wall unit manufacturers full range.

D. Samples for Verification: For the following products:

1. Fabric: Provide 12 by 24 inches (305 by 610 mm) Sample, from dye lot to be used for the Work, and with specified treatments applied. Mark top and face of fabric.
2. Panel Construction: 12 inches (300 mm) long Sample(s) showing core, edge profile, corner, and finish.
3. Mounting Devices: Full-size Samples.

1.6 QUALITY ASSURANCE

- A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials, fabrication, and installation.
1. Build full-size mockup of typical wall panel as shown on Drawings. Once approved, mockup may be used in the final construction.
 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with fabric and sound-absorbing wall unit manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.
- B. Deliver materials and units in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.

1.8 FIELD CONDITIONS

- A. Field Measurements: Verify locations of sound-absorbing wall units and actual dimensions of openings and penetrations by field measurements before fabrication.
- B. Pews and other non-movable furnishings will remain in place during installation of panels. Provide necessary protective coverings to prevent damages.

1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of sound-absorbing wall units that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
 - a. Acoustical performance.
 - b. Fabric sagging, distorting, or releasing from panel edge.
 - c. Warping of core.
 2. Warranty Period: Two (2) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. ESSI Acoustical Products Company.
- B. Source Limitations: Obtain sound-absorbing wall units from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: Provide sound-absorbing wall units meeting the following requirements as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - 1. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.
 - 2. Fire Growth Contribution: Comply with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 265.
 - 3. Core: Glass-fiber board.
 - 4. Edge Construction: Manufacturer's standard chemically hardened core with no frame.
 - 5. Edge Profile: Square.
 - 6. Corner Detail in Elevation: Square with continuous edge profile indicated.
 - 7. Joints between Panels: Tight joints, flush across face.
 - 8. Facing Material: Acoustic Fabric.
 - 9. Acoustical Performance: Sound absorption NRC of not less than 1.05.
 - 10. Nominal Core Thickness: 2 inches (51 mm).
 - 11. Panel Width: As indicated on Drawings.
 - 12. Panel Height: As indicated on Drawings.

2.3 SOUND-ABSORBING WALL UNITS

- A. Sound-Absorbing Wall Panels: Manufacturer's standard panel construction consisting of facing material laminated to front face, edges, and back edge border of core.
 - 1. Mounting Battered Panels: Back mounted to metal supports connecting multiple panels to form a single battered unit that leans out from the wall. Provide metal plates impregnated into the back surface of panels for attachment to metal framing supports as indicated on Drawings.
 - a. Refer to Section 09 22 16 "Non-Structural Metal Framing" for requirements for suspension of acoustic panels.
 - 2. Mounting of Wall Panels: Back mounted with manufacturer's standard impaling clips or "Z" clips secured to substrate or furring.
 - 3. Core: Glass-fiber board.
 - 4. Edge Construction: Manufacturer's standard chemically hardened core with no frame.

5. Edge Profile: Square.
6. Corner Detail in Elevation: Square with continuous edge profile indicated.
7. Joints between Panels: Tight joints flush across face.
8. Facing Material: Acoustic Fabric.
9. Acoustical Performance: Sound absorption NRC of not less than 1.05.
10. Nominal Core Thickness: 2 inches (51 mm).
11. Panel Width: As indicated on Drawings.
12. Panel Height: As indicated on Drawings.

2.4 MATERIALS

A. Core Materials:

1. Glass-Fiber Board: ASTM C 612, Type standard with manufacturer; nominal density of 6 to 7 lb/cu. ft. (96 to 112 kg/cu. m), unfaced, and dimensionally stable, molded rigid board; and with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

B. Facing Material Acoustic Fabric: Fabric from same dye lot; color and pattern as indicated on Drawings.

1. Manufacturer: Guilford of Maine.
2. Product Line/Pattern: FR701 2100 Acoustic.
3. Color: As selected by Architect from manufacturer's full range of colors.

C. Mounting Devices:

1. Battered Wall Panels: Concealed, imbedded reinforcing straps in back of unit and metal furring as described in Section 09 22 16 "Non-Structural Metal Framing" or as recommended by manufacturer to support weight of units.
2. Wall Mounted Panels:
 - a. Manufacturer's standard Impaling Clips.
 - b. Manufacturer's standard two-part panel "Z" clips.

2.5 FABRICATION OF SOUND ABSORBING WALL PANELS

A. General: Use manufacturer's standard construction except as otherwise indicated, with facing material applied to face, edges, and back border of dimensionally stable core and with rigid edges to reinforce panel perimeter against warpage and damage.

B. Measure each area and establish layout of panels and joints of sizes indicated on Drawings within a given area.

C. Glass-Fiber Board Cores: Chemically harden core edges and areas of core where mounting devices are attached.

1. Provide imbedded metal stiffeners as necessary to prevent sagging or bowing of wall panels span over openings.
2. Provide imbedded metal stiffeners and supports for attachment of panels to suspension system members. Stiffeners shall be sufficient to prevent sagging and bowing of panels.

- D. Facing Material: Apply fabric facing fully covering visible surfaces of unit; with material stretched straight, on the grain, tight, square, and free from puckers, ripples, wrinkles, sags, blisters, seams, adhesive, or other visible distortions or foreign matter.
 - 1. Square Corners: Tailor corners. Heat seal vinyl fabric seams at corners.
- E. Dimensional Tolerances of Finished Units: Plus or minus 1/16 inch for the following:
 - 1. Thickness.
 - 2. Edge straightness.
 - 3. Overall length and width.
 - 4. Squareness from corner to corner.

2.6 FABRIC-WRAPPED, PERFORATED-METAL SPEAKER GRILLES

- A. Perforated metal panel:
 - 1. Thickness: 1/8 inch.
 - 2. Percent Open: In excess of 60 percent.
 - 3. Curve panels to fit radius of stage.
- B. Facing Material Acoustic Fabric: Fabric from same dye lot; color and pattern as indicated on Drawings.
 - 1. Manufacturer: Guilford of Maine.
 - 2. Product Line/Pattern: FR701 2100 Acoustic.
 - 3. Color: As indicated on drawings.

2.7 FABRICATION OF FABRIC-WRAPPED, PERFORATED-METAL SPEAKER GRILLES

- A. Measure each section and establish layout of panels and joints of sizes indicated on Drawings within a given area.
- B. Perforated metal backing:
 - 1. Curve perforated panels to fit openings.
- C. Facing Material: Apply fabric facing fully covering visible surfaces of unit; with material stretched straight, on the grain, tight, square, and free from puckers, ripples, wrinkles, sags, blisters, seams, adhesive, or other visible distortions or foreign matter.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fabric, fabricated units, substrates, areas, and conditions for compliance with requirements, installation tolerances, and other conditions affecting performance of sound-absorbing wall units.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF SOUND-ABSORBING WALL UNITS

- A. Install sound-absorbing wall units in locations indicated with edges in alignment with walls and other units, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.
- B. Comply with sound-absorbing wall unit manufacturer's written instructions for installation of units using type of mounting devices indicated. Mount units securely to supporting substrate.
- C. Align fabric pattern and grain with adjacent units.

3.3 INSTALLATION OF FABRIC WRAPPED SPEAKER GRILLES

- A. Install speaker grilles in locations indicated with edges in alignment with walls and other units and faces flush.
- B. Attach to substrate with stainless screws and cup washers.

3.4 INSTALLATION TOLERANCES

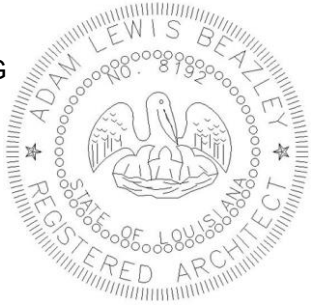
- A. Variation from Alignment with Surfaces: Plus or minus 1/16 inch.
- B. Variation from Level or Slope: Plus or minus 1/8 inch.
- C. Variation of Panel Joints from Hairline: Not more than 1/32 inch wide.

3.5 CLEANING

- A. Clip loose threads; remove pills and extraneous materials.
- B. Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

END OF SECTION 09 84 36

SECTION 099113 - EXTERIOR PAINTING AND FINISHING



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 surface preparation and the application of paint and finish systems on the following exterior substrates:
 - 1. Clay Masonry Units.
 - 2. Portland cement Plaster
 - 3. Steel.
 - 4. Galvanized metal.
- B. Related Requirements:
 - 1. Section 05 50 00 "Metal Fabrications" for surface preparation for paint system Coatings.
 - 2. Section 05 52 13 "Pipe and Tube Railings" for surface preparation for paint system Coatings.
 - 3. Section 09 91 23 "Interior Painting" for surface preparation and the application of paint systems on interior substrates.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
 - 1. Submit samples on rigid backing, 8 inches square.
 - 2. Step coats on samples to show each coat required for system.
 - 3. Label each coat of each sample.
 - 4. Label each sample for location and application area.
- C. Product List: For each product indicated, include the following:
 - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 - 2. Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
 - 3. VOC content.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.5 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 degrees F.
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F (3 degrees C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 - 1. Sherwin-Williams Company (The).
 - 2. Benjamin Moore & Co.
 - 3. ICI Paints.
 - 4. Kelly-Moore Paints.
 - 5. PPG Architectural Finishes, Inc.
 - 6. Tnemec.
- B. Products: Provide product listed in other Part 2 articles for the paint category indicated or equal products of manufacturers in paragraph above.

2.2 PAINT, GENERAL

- A. Material Compatibility:
 - 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.
- C. Colors: Match Architect's samples.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Masonry (Clay and CMUs): 12 percent.
 - 3. Portland Cement Plaster: 12 percent.
- C. Portland Cement Plaster Substrates: Verify that plaster is fully cured.
- D. Concrete Surfaces: Verify that concrete surfaces are completely cured and free of ridges, chips, honeycombs or other visual defects that will be visible after coating.
- E. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- F. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and re-prime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer. But not less than the following:
 - 1. SSPC-SP 2, "Hand Tool Cleaning."
 - 2. SSPC-SP 3, "Power Tool Cleaning."
 - 3. SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
 - 4. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."
- E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

- F. Exposed steel structure shall be coated with a high performance coating system that will be partially applied in the shop after fabrication and on site after erection. Refer to Section 05 12 00 "Structural Steel" for shop priming/coating requirements. The remainder of the system shall be field applied to provide the complete system specified herein.
 - 1. For exposed steel structure, touchup all damaged shop primed steel with primer specified for exposed steel structure.
- G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- H. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
 - 3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
 - 4. Paint entire exposed surface of window frames and sashes.
 - 5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 - 1. Paint the following work where exposed to view:
 - a. Equipment, including panelboards and switch gear.
 - b. Un-insulated metal piping.
 - c. Pipe hangers and supports.
 - d. Metal conduit.
 - e. Tanks that do not have factory-applied final finishes.
 - f. Electrical and mechanical equipment inside of the Equipment Yard are not required to be painted unless they extend into view from outside of the enclosure.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

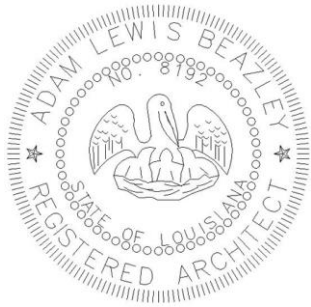
- A. Clay Masonry Substrates:
 - 1. Latex, flat System:
 - a. Prime Coat: S-W Loxon Concrete & Masonry Primer Sealer, A24W8300.
 - b. Intermediate: Latex Exterior, matching topcoat.
 - c. Top Coat: S-W A-100 Exterior Latex Flat, A6 Series.
- B. Portland Cement Plaster Substrates:
 - 1. Latex, flat System:
 - a. Prime Coat: S-W Loxon Concrete & Masonry Primer Sealer, A24W8300.
 - b. Intermediate: Latex Exterior, matching topcoat.
 - c. Top Coat: S-W A-100 Exterior Latex Flat, A6 Series.
- C. Steel Substrates:
 - 1. Water-Based Light Industrial Coating System:
 - a. Prime Coat: S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series.
 - b. Intermediate Coat: Light industrial coating, exterior, matching topcoat.
 - c. Topcoat: S-W Pro Industrial Acrylic Semi-Gloss Coating, B66-650 Series.
- D. Galvanized-Metal Substrates:
 - 1. Water-Based Light Industrial Coating System:
 - a. Prime Coat: S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series.
 - b. Intermediate Coat: Light industrial coating, exterior, matching topcoat.

- c. Topcoat: S-W Pro Industrial Acrylic Semi-Gloss Coating, B66-650 Series.

3.7 SCHEDULE OF COATINGS FOR EXTERIOR TRAFFIC SURFACES

- A. Concrete:
 - 1. Traffic Paint.
 - a. PPG 11-4 traffic marking paint.
 - b. Color: Traffic Yellow.

END OF SECTION 09 91 13



SECTION 09 91 23 - INTERIOR PAINTING
AND FINISHING

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 surface preparation and the application of paint systems on the following interior substrates:
 - 1. Steel.
 - 2. Galvanized metal.
 - 3. Wood.
 - 4. Gypsum board.
 - 5. Concrete masonry units.
- B. Related Requirements:
 - 1. Section 09 29 00 "Gypsum Board" for preparations of gypsum board for painting.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
 - 1. Submit Samples on rigid backing, 8 inches (200 mm) square.
 - 2. Step coats on Samples to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- C. Product List: For each product indicated, include the following:
 - 1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
 - 2. VOC content.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.5 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one (1) of the following:
 1. Sherwin-Williams Company (The).
 2. Benjamin Moore & Company.
 3. ICI Paints.
 4. PPG Architectural Finishes, Inc.
- B. Products: Provide product listed in other Part 2 articles for the paint category indicated or equal products of manufacturers in paragraph above.

2.2 PAINT, GENERAL

- A. Material Compatibility:
 1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. Colors: Match Architect's samples. Refer to finish schedule.

2.3 PRIMERS/SEALERS

- A. Primer Sealer, Latex, Interior:
 1. S-W ProMar 200 Latex Primer, B28W8200.
- B. Wood Primer Sealer:
 1. S-W Premium Wall and Wood Primer, BW28W8111.
- C. Dryfall Primer:

1. S-W DTM Acrylic Primer/Finish.

2.4 METAL PRIMERS

- A. Primer, Acrylic, for Metal:

1. S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series.

2.5 WATER-BASED PAINTS

- A. Latex, Interior, Flat:

1. S-W ProMar 200 Latex Flat, B30W200 Series.

- B. Latex, Interior, Eggshell:

1. S-W ProMar 200 Latex Eg-Shel, B20W2200 Series.

- C. Latex, Interior, Semi-Gloss:

1. S-W ProMar 200 Latex Semi-Gloss, B31W2200.

- D. Acrylic Dryfall, Flat:

1. S-W Low VOC Waterborne Acrylic Dryfall, B42W3.

2.6 SOLVENT-BASED PAINTS

- A. Alkyd, Interior, Semi-Gloss:

1. S-W ProMar 200 Alkyd Semi-Gloss, B34W200 Series.

2.7 PRIMERS AND SEALERS

- A. Shellac:

1. Zinsser, Bulls Eye Shellac.
2. Mix 25 percent shellac and 75 percent thinner as a washcoat prior to staining.

2.8 STAINS

- A. Stain, Semi-Transparent, for Interior Wood:

1. Minwax, Color Wash Transparent.
2. Stain Color: Weathered Gray.

2.9 SANDING SEALERS

- A. Wood Classics Sanding Sealer.

2.10 FAST DRY VARNISH

- A. Wood Classics Fast Dry Varnish.

2.11 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
 - 1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
 - 2. Testing agency will perform tests for compliance with product requirements.
 - 3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove non-complying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two (2) paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Masonry (Clay and CMU): 12 percent.
 - 2. Wood: 15 percent.
 - 3. Gypsum Board: 12 percent.
 - 4. Plaster: 12 percent.
- C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth and proper level of finish has been applied.
- D. Maximum Moisture Content of Interior Wood Substrates: 15 percent, when measured with an electronic moisture meter.
- E. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- F. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and re-prime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer. But not less than the following:
 - 1. SSPC-SP 2, "Hand Tool Cleaning."
 - 2. SSPC-SP 3, "Power Tool Cleaning."
 - 3. SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
 - 4. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."
- E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- F. Galvanized-metal substrates should not be chromate passivated (commercially known as "bonderized") if primers are field applied. If galvanized metal is chromate passivated, consult manufacturers for appropriate surface preparation and primers.
- G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- H. Wood Substrates to receive Opaque Finish:
 - 1. Sand wood surfaces with 100 grit sandpaper to provide smooth surface, ease edges.
 - 2. Scrape and clean knots, and apply coat of knot sealer before applying primer.
 - 3. Sand surfaces that will be exposed to view, and dust off.
 - 4. Prime edges, ends, faces, undersides, and backsides of wood.
 - 5. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- I. Wood Substrates to receive Transparent Finish:
 - 1. Sand wood surfaces with 100 grit sandpaper to provide smooth surface, ease edges.
 - 2. Scrape and clean knots, sand.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
 - 1. Paint the following work where exposed in occupied spaces:
 - a. Un-insulated metal piping.
 - b. Pipe hangers and supports.
 - c. Metal conduit.
 - d. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
 - e. Other items as directed by Architect.
 - 2. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

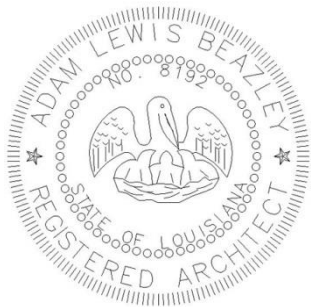
3.6 INTERIOR PAINTING SCHEDULE

- A. Steel Substrates:
 - 1. Alkyd Interior Semi-Gloss:
 - a. Prime Coat: Primer, Acrylic, for Metal.
 - b. Intermediate Coat: Alkyd, Interior Semi-Gloss, matching topcoat.
 - c. Topcoat: Alkyd, Interior Semi-Gloss.
- B. Galvanized-Metal Substrates:
 - 1. Alkyd Interior Semi-Gloss:
 - a. Prime Coat: Primer, Acrylic, for Metal.
 - b. Intermediate Coat: Alkyd, Interior Semi-Gloss, matching topcoat.
 - c. Topcoat: Alkyd, Interior Semi-Gloss.
- C. Wood Substrates: Opaque finish:
 - 1. Alkyd Interior Semi-Gloss:
 - a. Prime Coat: Wood Primer Sealer.
 - b. Intermediate Coat: Alkyd, Interior Semi-gloss matching topcoat.
 - c. Topcoat: Alkyd, Interior, Semi-Gloss.
- D. Wood Substrates: Transparent Colored Stain Finish.
 - 1. Varnish over color stain system.
 - a. Stain: Wood Classics Oil Stain with colored pigment.
 - b. Bottom: Wood Classics Sanding Sealer.
 - c. Intermediate Coat: Wood Classics Fast Dry Varnish.
 - d. Top Coat: Wood Classics Fast Dry Varnish.
- E. Gypsum Board Substrates:
 - 1. Latex System:
 - a. Prime Coat: Latex, Interior, matching topcoat.
 - b. Intermediate Coat: Latex, Interior, matching topcoat.
 - c. Topcoat: Latex, semi-gloss.
 - d. Topcoat: Latex, Flat for ceilings and black painted surfaces.

F. Open Ceiling Areas, Exposed Structure, Mechanical and Electrical Elements: Apply to all exposed elements:

1. Prime Coat: DTM Acrylic Primer/Finish.
2. Intermediate Coat: Acrylic Dryfall, matching topcoat.
3. Topcoat: Acrylic Dryfall.

END OF SECTION 09 91 23



SECTION 10 14 00 - SIGNAGE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Room and door signs.
- B. Interior directional and informational signs.

1.2 RELATED REQUIREMENTS

- A. Section 26 51 00 – “Lighting Fixtures”: Exit signs required by code.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.
- B. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, physical sign location keyed to floor plan, other text to be applied, sign and letter sizes, fonts, and colors.
 - 1. When room numbers to appear on signs differ from those on the Drawings, include the Drawing room number on schedule.
 - 2. When content of signs is indicated to be determined later, request such information from Owner through Architect at least two (2) months prior to start of fabrication; upon request, submit preliminary schedule.
 - 3. Submit for approval by Owner through Architect prior to fabrication.
 - 4. Include floor plan key.
- C. Samples: Submit two (2) samples of each type of sign, of size similar to that required for project, illustrating sign style, font, and method of attachment.
- D. Verification Samples: Submit samples showing colors specified.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three (3) years of documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Package signs as required to prevent damage before installation.
- B. Package room and door signs in sequential order of installation, labeled by floor or building.
- C. Store tape adhesive at normal room temperature.

1.6 FIELD CONDITIONS

- A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.
- B. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Flat Signs:
 - 1. Best Sign Systems, Inc.: www.bestsigns.com.
 - 2. Inpro: www.inprocorp.com.
 - 3. Mohawk Sign Systems, Inc.: www.mohawksign.com.
 - 4. OPA Signs & Graphics: www.opasigns.com.

2.2 SIGNAGE APPLICATIONS

- A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1 , unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.
- B. Room Signs: Provide a sign for every room, whether it has a door or not, not including corridors, lobbies, and similar open areas.
 - 1. Sign Type: Flat signs with applied character panel media as specified.
 - 2. Provide "tactile" signage, with letters raised minimum 1/32 inch and Grade II braille.
 - 3. Character Height: 1 inch.
 - 4. Sign Height: 9 inches, unless otherwise indicated.
 - 5. Service Rooms: Identify with room names and numbers to be determined later, not those shown on the Drawings.
 - 6. Restrooms: Identify with pictograms, Names (if indicated), and Braille.
- C. Interior Directional and Informational Signs:
 - 1. Sign Type: Same as room and door signs.

2.3 SIGN TYPES

- A. Flat Room Signs: Signage media without frame.
 - 1. Edges: Square.
 - 2. Corners: Square.
 - 3. Wall Mounting of One (1)-Sided Signs: Tape adhesive.
 - 4. Laminated-Sheet Sign: Sandblasted polymer face sheet with raised graphics laminated over subsurface graphics to acrylic backing sheet to produce composite sheet.
 - a. Composite-Sheet Thickness: Manufacturer's standard for size of sign.
 - b. Subsurface Graphics: Reverse halftone or dot-screen image.
- B. Color and Font: Unless otherwise indicated:
 - 1. Character Font: Helvetica, Arial, or other sans serif font as selected by the Architect from the Manufacturer's full range of standard fonts..
 - 2. Character Case: Upper case only.
 - 3. Background Color: Clear with second-surface coloring applied to back side of the panel..
 - 4. Character Color: Contrasting color as selected by the Architect from the Manufacturer's full range.

2.4 TACTILE SIGNAGE MEDIA

- A. Applied Character Panels: Acrylic plastic base, with applied acrylic plastic letters and braille.
 - 1. Total Thickness: 1/8 inch.
 - 2. Letter Thickness: 1/8 inch.
 - 3. Letter Edges: Square.

2.5 ACCESSORIES

- A. Tape Adhesive: Double sided tape, permanent adhesive.
- B. Blank-off panels: For signage installed over glass, provide and install a blank off panel on the opposite side of the glass from the signage; size, color, fastening method and material to match signage unless otherwise noted.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate surfaces are ready to receive Work.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install neatly, with horizontal edges level.
- C. Locate signs where indicated:
 - 1. Room Signs: Locate on wall at latch side of door with centerline of sign at 60 inches above finished floor.
 - 2. If no location is indicated obtain Owner's direction for the installation of signage.
 - 3. Sign locations to be in compliance with the current ADAAG requirements.
- D. Protect from damage until Substantial Completion; repair or replace damaged items.

END OF SECTION 10 14 00

SECTION 10 21 13 - TOILET COMPARTMENTS



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. Solid-polymer toilet compartments configured as toilet enclosures and urinal screens.
- B. Related Sections:
 - 1. Section 06 10 00 "Rough Carpentry" for blocking.
 - 2. Section 10 28 00 "Toilet and Bath Accessories" for toilet tissue dispensers, grab bars, purse shelves and similar accessories.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles and finishes.
- B. Shop Drawings: For toilet compartments. Include plans, elevations, sections, details and attachments to other work.
 - 1. Show locations of cutouts for compartment-mounted toilet accessories.
 - 2. Show locations of reinforcements for compartment-mounted grab bars.
 - 3. Show locations of centerlines of toilet fixtures.
 - 4. Show ceiling grid and overhead support or bracing locations.
- C. Samples for Initial Selection: For each type of unit indicated. Include Samples of hardware and accessories involving material and color selection.
- D. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated:
 - 1. Each type of material, color, and finish required for units, prepared on 6 inch square Samples of same thickness and material indicated for Work.
 - 2. Each type of hardware and accessory.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For toilet compartments to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Comply with requirements in GSA's CID-A-A-60003, "Partitions, Toilets, Complete".
- B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84, or another standard acceptable to authorities having jurisdiction, by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: 75 or less.
 - 2. Smoke-Developed Index: 450 or less.
- C. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities" for toilet compartments designated as accessible.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings and other construction contiguous with toilet compartments by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aluminum Castings: ASTM B 26/B 26M.
- B. Aluminum Extrusions: ASTM B 221.
- C. Brass Castings: ASTM B 584.
- D. Brass Extrusions: ASTM B 455.
- E. Steel Sheet: Commercial steel sheet for exposed applications; mill phosphatized and selected for smoothness.
 - 1. Electrolytically Zinc Coated: ASTM A 879/A 879M, 01Z .
 - 2. Hot-Dip Galvanized: ASTM A 653/A 653M, either hot-dip galvanized or galvanized.
- F. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.
- G. Stainless-Steel Castings: ASTM A 743/A 743M.
- H. Zamac: ASTM B 86, commercial zinc-alloy die castings.
- I. Plastic Laminate: NEMA LD 3, general-purpose HGS grade, 0.048 inch nominal thickness.

2.2 SOLID-POLYMER UNITS

- A. Toilet-Enclosure Style: Overhead braced.
- B. Urinal-Screen Style: Wall hung.
- C. Door, Panel, Screen, and Pilaster Construction: Solid, high-density polyethylene (HDPE) or polypropylene (PP) panel material, not less than 1 inch thick, seamless, with eased edges and with homogenous color and pattern throughout thickness of material.
 - 1. Heat-Sink Strip: Manufacturer's standard continuous, extruded-aluminum strip fastened to exposed bottom edges of solid-polymer components to prevent burning.
 - 2. Color and Pattern: One (1) color and pattern in each room as selected by Architect from manufacturer's full range.
- D. Pilaster Shoes: Manufacturer's standard design; stainless steel.
- E. Brackets (Fittings):
 - 1. Full-Height (Continuous) Type: Manufacturer's standard design; extruded aluminum.
- F. Overhead Cross Bracing for Ceiling-Hung Units: As recommended by manufacturer and fabricated from solid polymer.

2.3 ACCESSORIES

- A. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories.
 - 1. Material: Chrome-plated Zamac.
 - 2. Hinges: Manufacturer's standard paired, self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees.
 - 3. Latch and Keeper: Manufacturer's standard recessed latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.
 - 4. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.
 - 5. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.
 - 6. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.
- B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with anti-grip profile and in manufacturer's standard finish.
- C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For

concealed anchors, use stainless steel, hot-dip galvanized steel, or other rust-resistant, protective-coated steel.

2.4 FABRICATION

- A. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.
- B. Door Size and Swings: Unless otherwise indicated, provide 24 inch wide, in-swinging doors for standard toilet compartments and 36 inch wide, out-swinging doors with a minimum 32 inch wide, clear opening for compartments designated as accessible.

PART 3 - EXECUTION

3.1 INSTALLATION

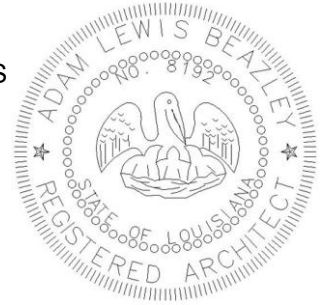
- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
 - 1. Maximum Clearances:
 - a. Pilasters and Panels: 1/2 inch.
 - b. Panels and Walls: 1 inch.
- B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 1-3/4 inches into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than two (2) fasteners. Hang doors to align tops of doors with tops of panels, and adjust so tops of doors are parallel with overhead brace when doors are in closed position.

3.2 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION 10 21 13

SECTION 10 28 00 – TOILET AND BATH ACCESSORIES



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. Toilet and bath accessories.

1.3 SUBMITTALS

- A. Product Data: Include construction details, material descriptions and thicknesses, dimensions, profiles, fastening and mounting methods, specified options and finishes for each type of accessory specified.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Provide products of same manufacturer for each type of accessory unit and for units exposed to view in same areas, unless otherwise approved by Contracting Officer.
- B. Product Options: Accessory requirements, including those for materials, finishes, dimensions, capacities, and performance, are established by specific products indicated in the Toilet and Bath Accessory Schedule.
 - 1. Products of other manufacturers with equal characteristics, as judged solely by Contracting Officer, may be provided.

1.5 COORDINATION

- A. Coordinate accessory locations with other Work to prevent interference with clearances required for access by disabled persons, proper installation, adjustment, operation, cleaning and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: Products indicated are manufactured by the following:
 - 1. Accessories:
 - a. Bobrick Washroom Equipment.
- B. Available Products: Subject to compliance to the provisions of the Contract Documents, equal products may be submitted for approval prior to bidding in accordance with the provisions of the Instructions to Bidders and Section 01 60 00 – Product Requirements.

2.2 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, with No. 4 finish (satin), in 0.0312 inch minimum nominal thickness, unless otherwise indicated.
- B. Brass: ASTM B 19, leaded and unleaded flat products; ASTM B 16, rods, shapes, forgings, and flat products with finished edges; ASTM B 30, castings.
- C. Sheet Steel: ASTM A 366/A 366M, cold rolled, commercial quality, 0.0359 inch minimum nominal thickness; surface preparation and metal pretreatment as required for applied finish.
- D. Galvanized Steel Sheet: ASTM A 653/A 653M, G60.
- E. Chromium Plating: ASTM B 456, Service Condition Number SC 2 (moderate service), nickel plus chromium electrodeposited on base metal.
- F. Baked-Enamel Finish: Factory-applied, gloss-white, baked-acrylic-enamel coating.
- G. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- H. Fasteners: Screws, bolts and other devices of same material as accessory unit, tamper and theft resistant when exposed, and of galvanized steel when concealed.

2.3 FABRICATION

- A. General: Names or labels are not permitted on exposed faces of accessories. On interior surface not exposed to view or on back surface of each accessory, provide printed, waterproof label or stamped nameplate indicating manufacturer's name and product model number.
- B. Surface-Mounted Accessories: Unless otherwise indicated, fabricate units with tight seams and joints and exposed edges rolled. Hang doors and access panels with continuous stainless-steel hinge. Provide concealed anchorage where possible.
- C. Recessed Accessories: Unless otherwise indicated, fabricate units of all-welded construction, without mitered corners. Hang doors and access panels with full-length, stainless-steel hinge. Provide anchorage that is fully concealed when unit is closed.
- D. Keys: Provide universal keys for internal access to accessories for servicing and re-supplying.

1. Number of Keys: Six (6).

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb and firmly anchored in locations and at heights indicated.
- B. Install grab bars to withstand a downward load of at least 250 lbf, when tested according to method in ASTM F 446.

3.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation and verify that mechanisms function properly. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

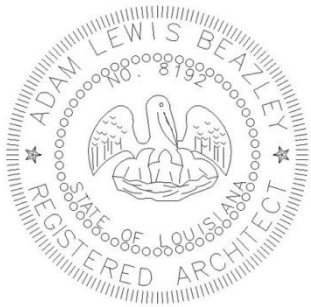
3.3 TOILET AND BATH ACCESSORY SCHEDULE

- A. Trash Receptacle (TR): Where this designation is indicated, provide semi-recessed satin finish stainless-steel waste receptacle complying with the following:
 1. Basis of Design: B-3942, Classic Series.
 2. Semi-recessed Type with Projecting Receptacle: Designed for nominal 4-inch wall depth with continuous, seamless wall flange. Includes a removable stainless steel bag holder.
 3. Capacity: 12.8 gallons (48.3 L).
 4. Material: 18-89, type 304, 22 ga. (0.8 mm) stainless steel.
- B. Surface Mounted Multi-Roll Toilet Tissue Holder (TPH): Where this designation is indicated, provide toilet tissue dispenser complying with the following:
 1. Basis of Design: B-4288
 2. Surface mount type w/ flush tumbler lock
 3. Capacity: Two (2) rolls
 4. Material: Satin Stainless Steel Finish
- C. Grab Bar (GB-1): Where this designation is indicated, provide stainless-steel grab bar complying with the following:
 1. Basis of Design: B-5806 by 36.
 2. Stainless-Steel Nominal Thickness: Minimum 0.05 inch.
 3. Mounting: Concealed with manufacturer's standard flanges and anchors.
 4. Gripping Surfaces: Manufacturer's standard slip-resistant texture.

5. Outside Diameter: 1-1/2 inches.
 6. Length: 36 inches.
- D. Grab Bar (GB-2): Where this designation is indicated, provide stainless-steel grab bar complying with the following:
1. Basis of Design: B-5806 by 42.
 2. Stainless-Steel Nominal Thickness: Minimum 0.05 inch.
 3. Mounting: Concealed with manufacturer's standard flanges and anchors.
 4. Gripping Surfaces: Manufacturer's standard slip-resistant texture.
 5. Outside Diameter: 1-1/2 inches.
 6. Length: 42 inches.
- E. Surface Mounted Sanitary Napkin Disposal (SND): Where this designation is indicated, provide Sanitary Napkin Disposal Unit complying with the following:
1. Basis of Design: B-270, Contura Series.
 2. Operation: Flip-up Lid.
 3. Capacity: 1.2 gallon leak proof removable plastic receptacle.
 4. Materials: 18-8 S, Type 304, 22 ga. (0.08 mm) thick stainless steel, all welded, satin finish. Container and cover.
- F. Mirror Unit (U): Where this designation is indicated, provide mirror unit complying with the following:
1. Basis of Design: B-290 2436.
 2. Frame: 18-8S, Type 304 heavy gauge stainless steel frame 3/4 inch by 3/4 inch.
 3. Glass: No. 1 quality 1/4 inch select float glass mirror.
 4. Tamperproof attachments.
- G. Robe Hook (RH): Where this designation is indicated, provide robe hook complying with the following:
1. Basis of Design: B-6727.
 2. Surface-Mounted Double Robe Hook: Stainless-steel, two (2) prong hook unit with rectangular wall bracket and backplate for concealed mounting.
 3. Materials: 18-8S, 304 stainless steel with satin finish.
 - a. Flange and Support Area: 22 ga.
 - b. Concealed Wall Plate: 16 ga.
 - c. Cap: 10 ga.
 - d. Size: 4 inches long by 2 inches high.
- H. Soap Dispenser (SD):
1. Basis of Design: B-2111.
 2. Surface-Mounted satin-finish stainless steel vertical tank soap dispenser.
 3. Materials: 18-8S, 304 stainless steel, 22-gauge with satin finish.
 - a. Concealed wall plate.
 - b. Size: 8 inches by 5 inches by 3-1/2 inches in depth.
 - c. Capacity: 40 fl oz.

END OF SECTION 10 28 00

SECTION 10 44 00 - FIRE EXTINGUISHERS,
CABINETS AND ACCESSORIES



PART 1 - GENERAL

1.1 SUMMARY

- A. Work Included:
 - 1. Portable fire extinguishers.
 - 2. Fire extinguisher cabinets.
 - 3. Fire extinguisher mounting brackets.

1.2 SUBMITTALS

- A. Product Data: Manufacturer's data showing compliance with Contract Documents.
- B. Samples: Finishes of cabinets, on actual or similar material.
- C. Operating and Maintenance Data: Instruction manual complying with requirements of NFPA 10.
- D. Certification: Installer shall submit written certification that the fire extinguishers installed comply with the contract documents and are fully and correctly charged.

1.3 QUALITY ASSURANCE

- A. Provide only fire extinguishers which comply with NFPA 10.
- B. Labels: Provide only fire extinguishers which are listed and labeled by Underwriters Laboratories Inc.

1.4 PROJECT CONDITIONS

- A. Do not deliver or install extinguishers until just before substantial completion.
- B. Do not use permanent fire extinguishers for construction period fire protection.

PART 2 - PRODUCTS

2.1 FIRE EXTINGUISHERS

- A. Manufacturers: Products of the following manufacturers, provided they comply with requirements of Contract Documents, will be among those considered acceptable:
 - 1. Fire extinguishers:
 - a. Basis of Design: Larson's Manufacturing Company.
 - b. Any manufacturer of listed and labeled extinguishers meeting requirements.
- B. Fire Extinguishers:
 - 1. Rating: 2A:10B:C – Model MP5.

2. Type: Multipurpose dry chemical (ammonium phosphate).
 - a. Stored pressure type.
 - b. 5 lb.
3. Wall mounted and cabinet mounted, as indicated.

C. Brackets: Provide wall bracket for each wall-mounted extinguisher.

2.2 CABINETS AND CABINET ACCESSORIES

A. Cabinets:

1. Basis of design: "Architectural Series"; Larsen's Manufacturing Company.
 - a. Products of other manufacturers, provided they comply with requirements of Contract Documents, will be acceptable.
2. To house one extinguisher.
3. Size: Inside box dimensions: 24 inches high, 9-1/2 inches wide, 6 inches deep; 6-1/4 inches deep into wall.
4. Style:
 - a. Fully recessed mounted door overlapping trim and concealed hinges where possible.
 - b. Semi-recessed mounted door overlapping trim and concealed hinges in locations where fully recessed is not possible.
5. Single flat door.
 - a. Solid door.
 - b. Door material: Medium Bronze anodized aluminum finish.
 - c. Surface mounted door handle, finished to match door.
 - d. Larson-Loc built-in cylinder lock system.
6. Trim (box flange or frame): Same material and finish as door.
7. Manufacturer's standard vertical lettering identifying contents of cabinet.
 - a. Letters: Black Die cut vinyl applied to face of door.
8. Box: Manufacturer's standard material and construction.
9. Provide wall bracket for extinguisher, inside cabinet.
10. Fire-rated cabinets at fire rated partitions.

B. Hinges: Provide concealed hinges for each door. Allow full 180 degree opening of door.

2.3 WALL BRACKETS

A. Bracket Type: Wall mounted with strap, #817.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare openings for recessed cabinets.

3.2 INSTALLATION

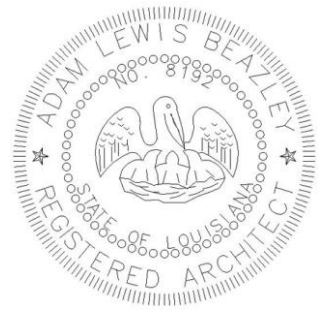
- A. Perform installation in accordance with the manufacturer's instructions except where more stringent requirements are shown or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of the Work.
- B. Install extinguishers in locations indicated.
- C. Install brackets for wall mounted extinguishers at height necessary to place the top of the extinguisher at 48 inches above finish floor.
- D. Install cabinets at locations indicated.
- E. Install cabinets at heights indicated.
- F. Install extinguishers.

3.3 OWNER PERSONNEL INSTRUCTION

- A. Instruct designated personnel of Owner in:
 - 1. Operation of extinguishers.
 - 2. Frequency of inspection and maintenance.
 - 3. Procedures for inspection and maintenance.
 - 4. Designation of inspection and maintenance entity.

END OF SECTION 10 44 00

SECTION 10 59 10 - ALUMINUM COUNTER
SUPPORT BRACKETS



PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wall mounted, heavy duty, welded aluminum brackets for supporting Countertop and vanity.

B. Related Sections:

- a. Section 06 10 00 "Rough Carpentry" for blocking in stud walls.
- b. Section 09 21 16 "Gypsum Board" for location of blocking and finish of gypsum board walls beyond..
- c. Section 12 36 61 "Quartz Countertops" for quartz counter that will be supported by brackets..

1.2 REFERENCES

A. American Architectural Manufacturer's Association (AAMA):

1. AAMA 606.1 – Voluntary Guide Specification and Inspection Methods for Integral Color Anodic Finishes for Architectural Aluminum.
2. AAMA 607.1 – Voluntary Guide Specification and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum.

B. American Society for Testing and Materials: ASTM B221 – Aluminum-Alloy Extruded Bar, Rod, Wire, Shape and Tube.

1.3 SUBMITTALS

A. Provide in accordance with Section 01 33 00 "Submittal Procedures:

1. Product data for support brackets.
2. Shop Drawings indicating dimensions and installation details.
3. Installation instructions.

B. Installer and names, addresses and telephone numbers of local sources for products.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Firm specializing in designing, patenting and fabricating unique aluminum storage systems, support brackets, handrails and other architectural specialties with ten (10) years minimum successful experience.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Rangine Corporation, 330 Reservoir Street, Needham, Massachusetts 03494, (800) 826-6006, www.rakks.com.
- B. Requests to use equivalent products of other manufacturer's shall be submitted in accordance with Section 01 25 00 "Substitution Procedures".

2.2 MATERIALS

- A. Material:
 - 1. Fabricate components from extruded aluminum sections complying with ASTM B221, 6063-T5 alloy and temper.
- B. Factory Applied Finishes:
 - 1. Exposed aluminum surfaces shall be free of scratches and other serious blemishes and be factory finished with aluminum mill finish.

2.3 WELDED ALUMINUM BRACKETS

- A. Vanity Brackets:
 - 1. Surface mounted bracket fabricated from miter cut and welded aluminum sections; vanity bracket as manufactured by Rangine Corporation:
 - a. Configuration: Vertical rear leg for attachment to wall, horizontal member for supporting vanity top and vertical front leg with sloped return for attachment of front baffle.
 - 2. Size: As indicated on Drawings.
 - a. Rear Leg: 18 inches.
 - b. Width: 2 inches.
 - c. S Leg: 20-3/8 inches
 - d. Front Return: 21-1/2 inches.
- B. Support Brackets:
 - 1. Surface mounted bracket fabricated from miter cut and welded aluminum sections; vanity bracket as manufactured by Rangine Corporation:
 - a. Configuration: Vertical rear leg for attachment to wall, horizontal member for supporting counter top.
 - 2. Size: As indicated on Drawings.
 - a. Rear Leg: 18 inches.
 - b. Width: 2 inches.
 - c. Front Return:
 - 1) 18 inches.
 - 2) 24 inches.

PART 3 - EXECUTION

3.1 COORDINATION

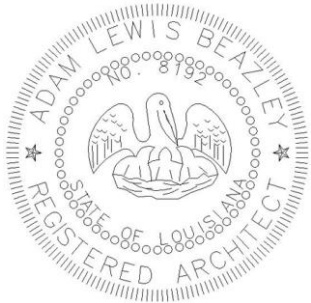
- A. Coordinate provision of support brackets with design and fabrication of countertops as specified in Section 12 36 61 "Quartz Countertops".
- B. Coordinate requirements for stud spacing, blocking and auxiliary structural supports to ensure adequate means for installation and anchorage of support brackets.
- C. Coordinate installation of flush mounted support brackets with application of gypsum board finish specified in Section 09 29 00 "Gypsum Board". Ensure that brackets are delivered to site and installed in a timely manner to allow for vertical bracket leg to be concealed by gypsum board.
- D. Coordinate installation of surface mounted support brackets with application of wall finishes. To the extent possible install brackets after finishes have been applied.

3.2 INSTALLATION

- A. Install support brackets in accordance with reviewed Shop Drawings and manufacturer's installation instructions.
- B. Install brackets at locations and heights indicated on Drawings. Verify locations in field with Architect.
- C. Install brackets rigidly to blocking, metal studs so that they are secure, plumb and aligned.
- D. Install with fasteners of type, size and quantity as supplied or recommended by bracket manufacturer for type of application and substrate.

END OF SECTION 10 59 10

SECTION 10 73 00 – PROTECTIVE COVERS



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. Suspended canopies
- B. Related Requirements:
 - 1. Section 05 50 00 "Metal Fabrications" for blocking, shims, reinforcing and supplemental support members for connecting to awning frame and anchorage.
 - 2. Section 06 10 00 "Rough Carpentry" for blocking, nailers, shims, reinforcing, framing and furring for connecting to awning frame and anchorage.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include styles, material descriptions, construction details, fabrication details, dimensions of individual components and profiles, hardware, fittings, mounting accessories, features and finishes for walkway covers.
 - 2. Include rated capacities, operating characteristics, electrical characteristics and furnished specialties and accessories.
- B. Shop Drawings:
 - 1. Include plans, elevations, sections, mounting heights and attachment details.
 - 2. Detail fabrication and assembly of walkway covers, including panel layout and spacing.
 - 3. Show locations for blocking, reinforcement and supplementary structural support.
- C. Samples for Initial Selection: For each type of exposed finish.
- D. Delegated-Design Submittal: For walkway covers.

1.4 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design walkway cover.
 - 1. Design Walkways in accordance with The Aluminum Design Manual 2000.
 - 2. Comply with the wind requirements of ASCE 7.

3. Provide an all welded extruded aluminum system complete with internal drainage. Non-welded systems are not acceptable.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- C. Regulatory Requirements: Provide walkway covers complying with the structural loading requirements indicated on the Structural Drawings.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Shall have a minimum of ten (10) years' experience in the manufacture and supplying of aluminum canopies.
- B. Installer: Shall have a minimum of five (5) years' experience installing pre-engineered aluminum canopies. Installation shall be in accordance with manufacturers Shop Drawings.

1.6 FIELD CONDITIONS

- A. Field Measurements: Where walkway cover installation is indicated to fit to other Work, verify dimensions of other Work by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for fenestration operation throughout the entire operating range. Notify Architect of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.7 WARRANTY

- A. Special Warranty: Manufacturer and fabricator agree to repair or replace components of walkway covers that fail in materials or workmanship within specified warranty period.
 1. Two (2) years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 1. The design is based on products fabricated by: Peachtree Protective Covers, Inc., 1477 Rosedale Drive, Hiram, GA 30141, 770-439-2120, fax 770-439-2122. Comparable products by the following manufacturers also will be acceptable:
 - a. Dittmer Architectural Aluminum.
 - b. Avadek Walkway Cover Systems.
 - c. Allstate Canopies and Rooms, LLC

2.2 MATERIALS

- A. Aluminum Members: Extruded aluminum, ASTM B 221, 6063 alloy, T6 temper.
- B. Fasteners: Aluminum, 18-8 stainless steel, or 300 series stainless steel.
- C. Protective Coating for Aluminum Columns Embedded in Concrete: Clear acrylic.
- D. Grout:
 - 1. Portland Cement: ASTM C 150, Type I.
 - 2. Sand: ASTM C 404.
 - 3. Water: Potable.
- E. Gaskets: Dry seal santoprene pressure type.
- F. Aluminum Flashing: ASTM B 209, Type 3003 H14, 0.040 inch, minimum.

2.3 MIXES

- A. Grout: 1 part portland cement to 3 parts sand, add water to produce a pouring consistency.

2.4 FABRICATION

- A. Support columns shall be rectangular in section with no fluting or scalloping. Integrated fascia and gutter trim shall be 6 inch in height.
- B. Post and beams shall be mechanically assembled utilizing 3/16 inch fasteners with a minimum shear stress of 350 lb. Pre-welded or factory-welded connections are not acceptable.
- C. Decking shall be designed with interlocking extruded members with mechanical fasteners field applied to provide structural integrity for the completed assembly.
- D. Concealed drainage. Water shall drain from covered surfaces into interregal gutter beam and directed to ground level discharge via one (1) or more designated support posts.

2.5 FLASHINGS

- A. Provide flashings as indicated on drawings. Match color of roof beams.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for supporting members, blocking, inserts, installation tolerances, lighting and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install walkway covers at locations and in position indicated, securely connected to supports, free of rack, and in proper relation to adjacent construction. Use mounting methods of types described and in compliance with Shop Drawings and fabricator's written instructions.
- B. Anchoring to In-Place Construction: Use anchors, fasteners, fittings, hardware and installation accessories where necessary for securing walkway covers to structural support and for properly transferring load to in-place construction.
- C. Coordinate awning installation with flashing and joint-sealant installation so these materials are installed in sequence and in a manner that prevents exterior moisture from passing through completed exterior wall and roof assemblies.
- D. Erect protective cover true to line, level, and plumb. Protect aluminum columns embedded in concrete with clear acrylic. Fill downspout columns with grout to the discharge level to prevent standing water. Install weep holes at top of concrete in non-draining columns to remove condensation.
- E. Provide hairline miters and fitted joints.

3.3 CLEANING AND PROTECTION

- A. Touchup Painting: Immediately after erection, clean walkway covers. Paint uncoated and abraded areas with same or compatible material as used for shop-applied finish painting.

3.4 PROTECTION

- A. Protect materials during and after installation.

END OF SECTION 10 73 00

SECTION 12 36 61 - QUARTZ COUNTERTOPS



PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Quartz countertops.
 - 2. Setting materials and accessories.
- B. Related Requirements:
 - 1. Section 06 41 16 "Plastic Laminate-Faced Architectural Cabinets" for bases of countertops.
 - 2. Section 10 59 10 "Aluminum Counter Support Brackets".

1.2 REFERENCES

- A. ASTM International (ASTM):
 - 1. C97 – Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone.
 - 2. C99 – Standard Test Method for Modulus of Rupture of Dimension Stone.
 - 3. C170 – Standard Test Method for Compressive Strength of Dimension Stone.
 - 4. C531 – Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
 - 5. C880 – Standard Test Method for Flexural Strength of Dimension Stone.
 - 6. E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.

1.3 ACTION SUBMITTALS

- A. Product Data: For countertop materials.
- B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining and cutouts for plumbing fixtures.
 - 1. Show locations and details of joints.
 - 2. Show direction of directional pattern, if any.
- C. Samples for Initial Selection: For each type of material exposed to view.
- D. Samples for Verification: For the following products:
 - 1. Countertop material, 6 inches (150 mm) square.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For Quartz material countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses and telephone numbers of local sources for products.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Fabricator of countertops.

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

1.8 COORDINATION

- A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

1.9 WARRANTY

- A. Provide manufacturer's ten (10) year warranty against defects in materials and workmanship.

PART 2 - PRODUCTS

2.1 QUARTZ COUNTERTOP MATERIALS

- A. Quartz Material: Homogeneous-filled plastic resin complying with ICPA SS-1.
 - 1. Basis of Design Manufacturer: Assured Flooring & Countertops.
 - 2. Sizes: Provide Standard 13/16 inch (2 cm) thickness unless otherwise indicated.
 - 3. Color: As indicated in drawings
 - 4. Finish: To be selected.

2.2 INSTALLATION MATERIALS

- A. Adhesive: Product recommended by solid surface material manufacturer.

2.3 COUNTERTOP FABRICATION

- A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."
 - 1. Grade: Premium.

- B. Fabricate countertops and vertical returns in largest sections practical. Countertop to vertical returns shall be fabricated with hairline joints.
- C. Configuration:
 - 1. Front: Square edges, slightly eased at top.
 - 2. Backsplash: Square edges, slightly eased at corner.
 - 3. End Splash: Matching backsplash.
- D. Countertops: Form countertops and vertical returns to thickness and configuration indicated using 2cm thick, quartz material.
- E. Backsplashes: 2cm thick, quartz material.
- F. Fabricate tops and returns with hairline joints unless otherwise indicated. Comply with quartz material manufacturer's written instructions for adhesives, fabrication, and finishing.
 - 1. Fabricate with loose backsplashes for field assembly.
- G. Joints: Fabricate countertops in sections for joining in field.
 - 1. Joint Locations: Not within 18 inches (450 mm) of a sink or cooktop and not where a countertop section less than 36 inches (900 mm) long would result, unless unavoidable.
 - a. Show joint locations on Shop Drawings.
 - 2. Splined Joints: Accurately cut kerfs in edges at joints for insertion of metal splines to maintain alignment of surfaces at joints. Make width of cuts slightly more than thickness of splines to provide snug fit. Provide at least three (3) splines in each joint.
- H. Cutouts and Holes: Make cutouts for fixtures or equipment in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
 - 1. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting 3/16 inch (5 mm) into fixture opening.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean surfaces to receive countertops; remove loose and foreign matter than could interfere with adhesion.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install countertops level to a tolerance of 1/8 inch in 8 feet (3 mm in 2.4 m), 1/4 inch (6 mm) maximum. Do not exceed 1/64 inch (0.4 mm) difference between planes of adjacent units.
- B. Secure countertops to subtops with adhesive according to quartz material manufacturer's written instructions. Align adjacent surfaces and using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

- C. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
 - 1. Install metal splines in kerfs in countertop edges at joints where indicated. Fill kerfs with adhesive before inserting splines and remove excess immediately after adjoining units are drawn into position.
 - 2. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.
- D. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.
- E. Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Predrill holes for screws as recommended by manufacturer.
- F. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
 - 1. Seal edges of cutouts in particleboard subtops by saturating with varnish.

3.3 CLEANING AND PROTECTING

- A. Clean countertops in accordance with manufacturer's instructions.
- B. Protect installed countertops with non-staining sheet coverings.

END OF SECTION 12 36 61

CERTIFICATION OF RESPONSIBILITY FOR
DOCUMENT PREPARATION

PROJECT NAME: Harvest Community Center, Nehemiah Project
RCE Project No.: 250020

MECHANICAL SPECIFICATIONS

THE FOLLOWING SPECIFICATION SECTIONS INCLUDED IN THIS PROJECT MANUAL WERE PREPARED BY OR UNDER THE RESPONSIBLE SUPERVISION OF THE COMPANY LISTED BELOW:

21 05 00	GENERAL PROVISIONS FOR FIRE SUPPRESSION
21 05 03	BASIC MATERIALS AND METHODS FOR FIRE SUPPRESSION
21 05 12	FIRE PROTECTION SYSTEM
22 05 00	GENERAL PROVISIONS FOR PLUMBING
22 05 03	BASIC MATERIALS AND METHODS FOR PLUMBING
22 07 00	PLUMBING INSULATION
22 10 00	PLUMBING
22 11 00	WATER SUPPLY
22 13 00	WASTE WATER DISPOSAL
22 16 00	NATURAL GAS PIPING/DISTRIBUTION
23 05 00	GENERAL PROVISIONS FOR HVAC
23 05 03	BASIC MATERIALS AND METHODS FOR HVAC
23 05 93	TESTING, ADJUSTING, AND BALANCING FOR HVAC
23 07 00	MECHANICAL INSULATION
23 09 00	TEMPERATURE CONTROLS FOR HVAC
23 30 00	AIR DISTRIBUTION FOR HVAC
23 70 00	AIR CONDITIONING FOR HVAC



Andrea B. Manceaux

12/12/2025

Andrea B. Manceaux, P.E.
Ritter Consulting Engineers Ltd.

**SECTION 21 05 03 - GENERAL PROVISIONS
FOR FIRE SUPPRESSION**

I. GENERAL

A. DIVISION OF SPECIFICATIONS

1. For Bidder's convenience only, this Division of the Specifications is divided into the following parts:

21 05 00	GENERAL PROVISIONS FOR FIRE SUPPRESSION
21 05 03	BASIC MATERIALS AND METHODS FOR FIRE SUPPRESSION
21 05 12	FIRE PROTECTION SYSTEM

B. GENERAL CONDITIONS

1. The General Conditions of the Architectural Specifications along with supplementary conditions, special conditions, information to bidders, and any other pertinent information and documents shall apply the same as if repeated herein. The contractor shall review the Architectural General Conditions. Where the requirements of Architectural General Conditions and these specs conflict for the contractor, the most stringent shall be applied.
2. Sprinkler subcontractor shall be the sole source responsible party to furnish and install the sprinkler system. Sprinkler contractor shall be properly licensed to perform this work.
3. Wherever the word contractor is mentioned in Division 21 of these specifications, it is intended to mean the Sprinkler Contractor/Plumbing Contractor as appropriate. These are sub-contractors to the General Contractor, who has the contract with the owner. It is the General Contractor who bears the responsibility to fulfill this part of the project (Division 21– Fire Suppression) under the contract with the owner. The General Contractor shall be responsible for all costs associated with any and all building errors and omission of the sub-contractor.

C. SCOPE OF WORK

1. Furnish labor, materials and equipment necessary to provide and install the complete sprinkler portion of this contract, as called for herein and on accompanying drawings. Parts of the Fire Suppression division may be bid separately or in combination at the contractor's option; however, it

shall be the responsibility of the General Contractor to assure himself that all items covered in the Fire Suppression Division have been included if he chooses to accept separate bids.

2. Contractor shall refer to the Mechanical, Architectural, Structural, and Electrical drawings and install all equipment, piping, etc., to meet building and space requirements. **No equipment shall be bid on or submitted for approval if it will not fit in space provided or coordinated with other trades involved on the project.**
3. It is the intention of these Specifications that all fire suppression systems shall be furnished complete with all necessary valves, controls, insulation, piping, devices, equipment, etc., necessary to provide a satisfactory installation in working order and in accordance with all Federal, State and Local codes and ordinances.
4. Contractor shall visit the site and acquaint himself thoroughly with all existing facilities and conditions which would affect his portion of the work. Failure to do so shall not relieve the contractor from the responsibility of installing his work to meet conditions.
5. Lack of coordination shall not be acceptable and shall not be a reason for poorly installed work or additional cost to this trade or others on the project. All associated extra cost shall be borne by the contractor. The General Contractor shall be responsible for all costs, time and liquidated damages associated with lack of coordination or poor coordination.

D. LOCAL CONDITIONS

1. Location and elevation of all services is based on information obtained from the Owner. However, this shall serve as a general guide only and the contractor shall visit the site and verify the location and elevation of this service to his own satisfaction in order to determine the amount of work required for the execution of the contract.
2. Contractor shall contact the various utility companies, determine the extent of their requirements and cooperate with the utility company in reaching a finished product. Contractor shall pay charges by Utility Company for extensions, connections, meter fees, street patching, etc.
3. In case major changes are required, this fact, together with the reasons therefore, shall be submitted to the Architect, in writing, not less than seven days before the date of bidding. Failure to comply with this requirement will make the contractor liable for any changes, additions and expenses necessary for the successful completion of the project.

E. CUTTING AND PATCHING

1. Initial cutting and patching shall be the responsibility of the General Contractor with the Sprinkler Contractor responsible for laying out and marking any and all holes required for the reception of his work. No structural beams or joists shall be cut or thimble without first receiving the approval of the Architect/Engineer. After initial surfacing has been done, any further cutting, patching and painting shall be done at this contractor's expense.
2. Cutting and patching shall be done in such a manner that the surrounding work will be restored to its original condition.
3. The sprinkler piping shall run clear of all other trades. It may be necessary to penetrate beams. Install thimbles as required and as approved by the Structural Engineer and Architect.

F. CODES AND STANDARDS

1. The entire sprinkler work shall comply with the rules and regulations of the City, Parish and State in which this project is being constructed including the State Fire Marshal and State Board of Health. All modifications required by these authorities shall be made without additional charge to the Owners. The Sprinkler Contractor shall report these changes to the Architect and secure his approval before work is started.
2. In addition to the codes mentioned, all sprinkler work and equipment shall conform to the applicable portions of the following Specifications, codes and regulations:
 - a. National Electric Code
 - b. National Fire Protection Association
 - c. American Society of Mechanical Engineers
 - d. Underwriters's Laboratories
 - e. International Building Code (LA)
 - f. International Plumbing Code with Louisiana Amendments
 - g. International Fire Code (LA)
3. Materials, equipment and accessories installed under this contract shall conform to all rules, codes, etc., as recommended by National Associations governing the manufacturer, rating and testing of such materials, equipment and accessories. Materials shall be new and of the best quality and first class in every respect. Whenever directed by the

Architect, contractor shall submit a sample for approval before proceeding.

4. Where laws or local regulations provide that certain accessories and parts be installed on equipment, it shall be understood that such equipment be furnished complete with the necessary accessories whether or not called for in these Specifications.
5. Material and equipment furnished or installed as part of these construction documents shall be installed and operated in strict accordance with the respective manufacturer's guidelines for installation and operating instructions. The manufacturer's guidelines shall become part of the construction documents.

G. MINOR DEVIATIONS

1. Plans and detail sketches are submitted to limit, explain and define conditions, specified requirements, pipe sizes and manner of erecting work. Structural or other conditions may require certain modifications from the manner of installation shown and such deviations are permissible and shall be made as required, but, specified sizes and requirements necessary for satisfactory operation shall remain unchanged. It may be necessary to shift pipes and these changes shall be made as required. All such changes shall be referred to the Architect/Engineer for approval before proceeding. Extra charges shall not be allowed for these changes.
2. No structural beams or joists (concrete or steel) shall be cut or thimble without first receiving the approval of the Architect/Structural Engineer. After initial surfacing has been done, any further cutting, patching and painting shall be done at the Sprinkler Contractor's own expense.
3. Contractor shall realize that the drawings could delve into every step, sequence or operation necessary for the completion of the project without drawing on the contractor's experience or ingenuity. However, only typical details are shown on the plans. In cases where the contractor is not certain about the method of installation of his work, he shall ask for details. Lack of details shall not be an excuse for improper installation. Submit installation shop drawings with manufacturer's details for review prior to installation.
4. In general, the drawings are diagrammatic and the contractor shall install his work in a manner so that interferences between the various trades are avoided. In cases where interferences do occur, the Architect/Engineer is to state which equipment, piping, etc., is to be relocated regardless of which item was first installed.

H. WORKMANSHIP

1. Workmanship shall be of highest grade, highest quality and all construction shall be done according to the best practice of the trade. Work shall be completed to satisfaction of the Architect/Engineer.

I. COORDINATION

1. Coordinate work of the different trades to avoid interferences between sprinkler and all other work. All piping, etc., shall be installed in lines as required to accomplish this end whether or not shown on the plans.
2. There will be a certain amount of work which must be coordinated with the Owner. This contractor shall coordinate required work with the Owner through the General Contractor using procedures acceptable to the Architect and Owner. The contractor shall maintain documentation of coordinated work.
3. This contractor shall coordinate and confirm that all equipment requiring electric service will be adequately and properly serviced by Electrical Contractor. Any conflicts shall be brought to the attention of the Architect/Engineer prior to ordering the equipment. **VERIFY ALL VOLTAGES WITH THE ELECTRICAL PLANS AND ELECTRICAL CONTRACTOR.**
4. This contractor shall coordinate the space clearances required for the sprinkler system with the structure, ceilings, lights, ductwork, etc. In some cases, due to space limitations, it may be necessary to reroute piping to meet the conditions of the project. Any rerouting required shall be part of this project and done without any additional cost to the Owner. **DO NOT MAKE PIPING WITHOUT COORDINATION. Avoid conflicts with other trades.**
5. This contractor shall coordinate the installation of sprinkler lines with all parts of the structural foundation system and structural building systems. Provide sleeves through grade beams or concrete beams at all conflicts. All points of penetration of foundation shall be reviewed by the Architect/Engineer prior to rough-in. All sleeves shall be installed per instructions and details of the Structural Engineer.
6. All piping shall be run as high as possible with sleeves through concrete beams to avoid conflicts. This means the piping shall run in or through the structure unless approved otherwise by the Architect/Engineer.

J. REVIEW OF MATERIALS

1. Whenever manufacturers or trade names are mentioned in these plans or Specifications, the words "or approved equivalent" shall be assumed to follow whether or not so stated. Manufacturers or trade names are used to establish a standard of quality only and should not be construed to infer a preference. Equivalent products which meet the Architect's approval will be accepted; however, these requests for acceptance of products must be received by the Architect a minimum of ten days prior to bid date. Submission shall include manufacturer's name, model number, rating table and construction features. Upon receipt and checking of this submittal, the Architect will issue an addendum listing items which are approved as equivalent to those specified. The contractor shall base his bid solely on those items specified or included in the "Prior Approval Addendum" as no other item will be acceptable. Prior approval of a particular piece of equipment does not mean automatic final acceptance and will not relieve is in complete accord with plans and Specifications and will fit into the space provided. Submit shop drawings on all items of equipment for approval as hereinafter specified.
2. Should a substitution or variation occur, the better quality or greater quantity of material or work shall be furnished. This also does not preclude other manufacturers if they meet the following criteria:
 - a. Product proposed for substitution shall be equal or superior to that specified in construction, efficiency, utility and function.
 - b. Physical size of substitute brand shall not be greater than space provided for it.
 - c. Profile of substitution shall be same concerning size, shape, indentations, recesses, etc.
 - d. Complete illustrations, specifications and description of substitution shall be submitted for approval.
 - e. Availability and proximity of manufacturer's service representative shall be factors considered in substitution approval.
 - f. Substitution and/or variations shall be reviewed and allowed when there is no change in cost to the project and shall be made at the discretion of the Engineer.

K. SHOP DRAWINGS

1. The General Contractor shall submit sprinkler submittal within 30 days of the date of the contract between owner and contractor or the date of notice to proceed as issued by the owner to the General Contractor. The submittals shall have been submitted to the General Contractor within 30 days after the construction contract has been signed. The General

Contractor and his sub-contractors shall bear all responsibility for any extra costs or delays to late submittals of shop drawings.

2. Drawings shall be presented in a clear and thorough manner.
3. Details shall be identified by reference to sheet detail, schedule or room numbers shown on contract and drawings.
4. Drawings shall contain the following information:
 - a. Date.
 - b. Number of the drawing or revision.
 - c. Name of project or facility.
 - d. Name of contractor and subcontractor.
 - e. Clear identification of contents and location of work.
5. Preparation:
 - a. Clearly mark each copy to identify pertinent products or models.
 - b. Show performance characteristics and capacities.
 - c. Show dimensions and clearances required.
 - d. Show wiring or piping diagrams and controls.
 - e. Show weights and mounting data.
 - f. Provide letter documentation confirming that all coordination with other trades effected have been done. This is especially necessary with the electrical requirements and rough-in requirements.
6. Manufacturer's standard schematic drawings and diagrams:
 - a. Modify drawings and diagrams to delete information which is not applicable to the work.
 - b. Supplement standard information to provide information specifically applicable to the work.
7. Office samples shall be of sufficient size and quantity to clearly illustrate:
 - a. Functional characteristics of the product, with integral related parts and attachment devices.
 - b. Full range of color, texture and pattern.
8. Equipment shop drawing shall be prepared by the contractor/supplier. These shop drawing shall include the manufacturer's performance data and installation manuals. In addition, the shop drawings shall show the installation specific to this project.

9. Assemble certificates, executed by each of the respective manufacturers, suppliers, and subcontractors.
10. All submittals shall be submitted prepaid and in ample time for review before installation.
11. Six (6) copies of each submittal shall be submitted to the Architect.
12. These shop drawings shall be supplied as part of this contractor's contract. Any drawings not approved shall be resubmitted until approved. **Submit all shop drawings at the same time. No separate items will be accepted.**
13. Time necessary for review of samples, certificates, test reports, and shop drawings is at least 30 calendar days after receipt of the item. All materials installed in the work shall match the reviewed submittals. After a submission has been reviewed, no substitutions will be permitted without written approval by the Architect.
14. The Architect's/Engineer's review of shop drawings shall not relieve the contractor from the responsibility of incorrectly figured dimensions or any other errors that may be contained in these drawings. The omission from the shop drawings or specifications, even though approved by the Architect, shall not relieve the contractor from furnishing and erecting same.
15. Any delays caused by contractor not submitting shop drawings within a timely manner shall be the problem of the responsible subcontractor and the General Contractor.
16. Sprinkler shop drawings shall include the Architectural review letter, plan review form, and check for the review fees. Contractor shall be responsible for any/all fees for additional reviews of resubmittals.

L. UTILITIES

1. Connect all mechanical utilities at the points indicated on the drawings and extend such utilities to the building and to equipment or facilities requiring same.
2. Contractor shall pay all service and connection charges required by utilities companies and/or site conditions (offsets, conflict boxes, etc.).

3. Contractor shall include all costs required by utility companies to extend utilities to the site. It is the responsibility of the contractor to obtain these fees from the utility companies and include those costs in the bid.

M. REPAIRING ROADWAYS AND WALKS

1. Where this contractor cuts or breaks roadways or walks to lay the piping, he shall repair or replace these sections to meet the Architect's approval. Repair of public roadways and highways shall be done as per the Federal, State and Local agencies having jurisdiction. Contractor shall obtain and pay for all permits.

N. EXCAVATION AND BACK FILL

1. Trench and excavation work shall include excavating, preparing of trenches, and backfilling as specified. Contractor shall install caution tape 12 inches above all piping, conduit, etc., as backfilling processes.
2. Trench and excavation work shall not include pavement breaking, cutting of holes through foundation walls and floors, removal of obstructions, relaying and/or repairing of floors, and repaving, which work shall be the responsibility of the General Contractor.
3. Contractor shall do all necessary trenching, excavation and backfilling for the proper installation of his work. Care shall be taken not to excavate below depth required, that trench beds are well rounded and that ground under pipe line is firm and secure before any pipe is laid. Trenches shall be excavated where bells of pipe occur in order to insure a pipe resting on the entire length of the bottom of the trench.
4. Unless otherwise noted, minimum cover over underground lines shall be 2-1/2 feet, except under streets and parking lots where minimum cover shall be 3 feet.
5. The width of the trench shall be sufficient to permit thorough compaction of the backfill under and around the pipe but not exceeding the external diameter of the pipe by more than 12 inches. Excavation for pipes shall be by hand and/or machine and as specified herein and shall confirm to the lines and elevations indicated on the plans.
6. The pipe shall be placed on a uniformly firm and compacted bed of sand, carefully shaped to support the pipe at the desired grade and so that any reaction will be distributed as nearly uniform as possible over a horizontal width of not less than six-tenths (6/10) of the outside diameter and all possibility of concentration of the reaction at or near the vertical diameter

eliminated. The bed shall be shaped as to fit the lower part of the pipe exterior for at least 10 percent of its overall height.

7. The pipe shall be placed on a firm foundation. Any muck or other objectionable material found during excavation and preparation of the bed shall be removed and replaced with suitable bed material directed by the Architect.
8. All trenches and excavation shall be backfilled in a reasonable time after the pipes are installed unless otherwise directed by the Architect. Special care shall be taken in placing the backfill and extra care shall be used to obtain compaction under and along sides to the top of the pipe.
9. The backfill shall be placed in loose layers not exceeding 6 inches in depth under and around the pipe and not exceeding 8 inches over the pipe. Each layer shall be compacted to the compaction requirements as specified by the Architect.
10. Compaction shall be by hand and pneumatic tampers and the successive layers shall be added and compacted until the trench is completely filled and brought to elevation as directed. Back-filling shall be done in such a manner as to avoid injurious top or side pressures on the pipe.
11. Improper backfilling and compacting shall be cause to have the trench opened to expose the pipe for inspection then properly backfilled and compacted with fill material.
12. Where trenching is for piping, the bottom of the trench shall have minimum 95 percent compaction and shall be bedded with minimum 12 inches compacted sand, crushed stone or shell on undisturbed soil (minimum 95 percent compaction).

O. MATERIALS

1. Work materials shall be new and the best of their respective kinds, and shall bear the label of NFPA, ASME Code, and UL where such standard has been established for the particular item of equipment used.

P. MATERIAL STORAGE

1. General: Provide space for storage of material and equipment at ground level. Roof surfaces shall not be used for storage of materials or equipment. Any storage within the building shall be approved by the Architect/Engineer prior to use of the space.

2. Exterior: Pipe, fitting, or other materials stored outside of building shall be set on wood or steel racks or platforms inside storage container units. All necessary provisions shall be made to keep water and debris away from such stored material. Ends of pipes and valves shall be kept sealed until used.
3. Warehousing: Equipment subject to rusting shall be kept warehoused until just prior to setting. If necessary the warehouse shall have climate controlled conditions.
4. Offsite warehousing shall be approved by the Architect and Owner only.
5. Any warehousing used shall be approved by the Owner and an insurance certificate naming the Owner as insured shall be provided to the Owner.

Q. GROUND AND CHASES

1. Contractor shall see that all required chases, sleeves, grounds, holes and accessories necessary for the installation of his work are properly built in as the work progresses; otherwise he shall bear the cost of providing them.

R. SPECIAL TOOLS

1. Special tools required for proper operation or maintenance of any equipment provided under this contract shall be delivered to the Owner at the completion of the project.

S. FILL AND CHARGES FOR EQUIPMENT

1. Fill and charge with materials or chemicals all devices or equipment as required to comply with the manufacturer's guarantee or as required for proper operation of the equipment.
2. This contractor shall flush systems as required per local and state jurisdictions and equipment/material manufacturer's guidelines (chlorination, chemical treatment, etc.).

T. EQUIPMENT ACCESS

1. Large equipment to be installed in building, which is too large to permit access through doorways, shall be brought to the job by the contractor and placed before enclosing structure. Equipment shall be cribbed up from the floor by the contractor and covered where necessary or directed.

U. EQUIPMENT IDENTIFICATION

1. Stenciling: All items of major sprinkler equipment such as valves, alarms, etc., shall be neatly and clearly stenciled in letters not less than 1 inch high, with the same designation as appears on drawing. Location and color of such stenciling shall be appropriate for ready identification and/or as directed by the Architect. One set of compatible metal interlocking stencil letters and numbers shall be turned over to the Owner at the completion of the job. At contractor's option engraved plastic adhesive tags may be used. Tags used outdoors shall be listed for such use.
2. Pipe Coding: All piping, etc., both insulated and bare, shall be color coded with a general purpose pipe marker for interior locations and a 6 inch enamel painted band for exterior locations, and stenciled as to service and characteristics on the 10 foot centers and/or as directed. Directional arrows not less than 1/2 inch wide and not less than 6 inches long shall be permanently stenciled on each line at each stencil location. Stenciling shall be located such that it is clearly visible from floor or adjacent service platform. Coding shall be as per schedule approved by Owner through submittal to Architect. At contractor's option, pre-manufactured vinyl pipe labels and directional arrows may be used but shall be banded on either end to secure to pipe.

V. TEMPORARY USE OF EQUIPMENT

1. The permanent equipment installation shall not be used for temporary purposes by the contractor. Contractor shall provide temporary services as required in order to complete installation of his work.
2. Acceptable Use Without Specific Authorization: Temporary use shall not be construed to mean "bumping" of electric motors on equipment to verify rotation direction nor short time operation of systems for test purposes.

W. CLEANING AND ADJUSTING

1. Upon completion of his work, the contractor shall clean and adjust all equipment, controls, valves, etc. Clean all piping, heads, etc., and leave entire installation in good working order.

X. PAINING

1. This contractor shall obtain the services of a painting sub-contractor as part of his contract with the General Contractor for all painting.
2. General: Except for standard factory finishes, all pipe, pipe covering, equipment, supports, hangers, etc., exposed inside and outside building or

in equipment room shall be painted. This contractor shall prepare surface of material to receive first coat of paint. All subsequent coatings shall be prepared by Painting Subcontractor. Requirements covering paints, workmanship and preparation of surfaces as stated in Architectural Specifications shall govern. Colors shall be approved by Owner. All submittals for review shall be through Architect. Do not paint sprinkler heads, all painted heads shall be replaced.

3. Damage: Where standard equipment factory finishes have been damaged or scratched, the damaged area shall be repaired or replaced by the contractor to match the original finish.
4. Preparation: Thoroughly clean surfaces of all rust, scale, cement, and dirt from all equipment, piping or other work installed and leave ready for finish painting.
5. All exposed piping shall be painted. Paint with two (2) coats of paint. Submit color code chart with sample chips to Architect for review prior to starting work.

Y. FIRESTOPPING

1. Penetrations through rated construction shall be sealed with a material capable of preventing the passage of flames and hot gases when tested in accordance with ASTM-E814.
2. Notify Architect for inspection of all completed fire and/or smoke barrier walls before any construction is installed that may conceal the firestopping material installation.
3. Access to random selected areas may be required by the architect at the time of final inspection should notification not be given.
4. Provide detailed instructive cutsheets of fire penetration sealing system (firestopping) used to the architect at the time of inspection. Random selective sampling by the contractor will be observed by the architect and State Fire Marshal.

Z. NOISE VIBRATION

1. General: Take the utmost precautions in the installation of the equipment and piping to prevent noise and vibration transmission.

2. Isolation of equipment: Equipment that would tend to cause noise or vibration shall be isolated to prevent noise transmission to the building or to other equipment.
3. Equipment Connections: Piping, conduit, or other connections to equipment shall be isolated. The contractor shall be responsible for the prevention of noise and vibration transmission through these connections to equipment.

AA. PERMITS, INSPECTIONS AND TESTS

1. Contractor shall obtain and pay for permits, fees, etc., for the installation, inspection, service connections, verifying location or construction of the work which are required by any authority and/or agencies having jurisdiction.
2. Contractor shall arrange and pay for inspections, examinations and tests required to obtain complete and final acceptance of all fire protection systems. Contractor shall deliver certificates of all such inspections to the Architect.
3. Contractor shall notify Architect and local governing authorities before any tests are made and tests are not to be drawn off a line covered until examined and approved by the authorities. In the event defects are found, these shall be corrected and the work shall be retested.
4. Prior to requesting final inspection by the Architect, the contractor shall have a complete coordination and adjustment meeting of all of his subcontractors directly responsible for the operation of any portion of the system. At the time of this meeting, each and every sequence of operation shall be checked to assure proper operation. Notify the Architect in writing ten (10) days prior to this meeting instructing him of the time, date and whom you are requesting be present. This project shall not be accepted until the above provisions are met to the satisfaction of the Architect.

BB. TRAINING OF MAINTENANCE PERSONNEL

1. Contractor shall provide on the job training for Owner's personnel upon completion of the work including testing and adjustment. Minimum 8 hours of onsite training shall include maintenance checks, lubrication of components, and troubleshooting techniques.

CC. OPERATION AND MAINTENANCE INSTRUCTIONS

1. Provide Owner with four (4) copies of printed instructions indicating various pieces of equipment by name and model number complete with parts lists and maintenance and repair instructions. This information shall be bound in plastic covered notebooks. Submit the manuals to the Architect for approval.
2. Include all warranty certificates or statements in a separate section of the manuals. Provide all materials and test certificates for the final inspection.

DD. GUARANTEE

1. Contractor shall guarantee all materials, equipment and workmanship for a period of one year from the date of final acceptance of the project. This guarantee shall include furnishing of all labor and material necessary to make any repairs, adjustments or replacement of any equipment, parts, etc., necessary to restore the project to first class condition. This guarantee shall exclude only the changing or cleaning of filters.
2. If the contractor's office is in excess of a 50 mile radius of the project, he shall appoint a local qualified contractor to perform any emergency repairs or adjustments required during the guarantee period. The contractor appointed to provide emergency services shall be submitted to the Architect for his approval.

EE. WARRANTIES

1. Assemble warranties executed by each of the respective manufacturers, suppliers, and subcontractors into a warranty book and prepare a table of contents.
2. Two (2) original signed copies of each warranty are required.
3. Provide complete information for each item including:
 - a. Product and work item.
 - b. Local supplying firm or manufacturer's dealer, with name of principal, address and telephone number.
 - c. Scope of warranty.
 - d. Date of beginning of warranty.
 - e. Duration of warranty.
 - f. Provide information for Owner:
 - 1) Proper procedure to evoke the warranty in case of failure.
 - 2) Instances which might affect the validity of the warranty.
 - g. Contractor, name of responsible principal, address and telephone number.

- h. All contractors and manufacturers equipment warranties shall start at the acceptance of the project by the Owner.

FF. RECORD DRAWINGS

1. Contractor shall maintain two (2) sets of drawings of the original construction documents to utilize as markup sets to record field modifications from original construction documents. Once approval has been gained from the Architect, the contractor shall record these variances on the two (2) sets in a neat and readable manner. Noted shall be sizes, locations, changes in directions, etc. with distances dimensioned from columns, walls, inverts, etc. The maintenance and cost of these documents shall be the responsibility of the contractor.

GG. DEMOLITION

1. This contractor shall do all demolition as shown on the plans. The contractor shall make the areas ready for the new construction work. All demolition debris, piping, equipment, etc., shall be removed from the site by this contractor. All demolition work shall be scheduled through the General Contractor to prevent interruption of any existing services. Do not start any demolition which would interrupt the building operation without scheduling with the Owner (schedule through the General Contractor).
2. The Owner shall retain first salvage rights to anything within the demolition area. If the Owner selected an item to be retained, then this contractor shall remove it with care and deliver the item to the Owner designated location on site. Anything not retained by the Owner shall become the property of the contractor and be removed from the site.

HH. MATERIALS CONTAINING HAZARDOUS SUBSTANCES OR COMPONENTS

1. This contractor shall not provide any material or component of equipment which contains asbestos, lead based paint or PCBs. The contractor shall provide certificates or manufacturer's statements/letters to show that the products and/or building materials do not contain asbestos, lead based paint or PCBs.
2. If any product or building material is found to contain asbestos, lead based paint or PCBs, the contractor shall bear all cost for removal, abatement, and disposal of materials in accordance with all state and federal regulations. The contractor shall install replacement materials to the satisfaction of the Architect at no additional cost to the project.

3. During the construction, if the contractor suspects that any material in the building contains or is a hazard material (asbestos, lead, PCB, mercury, etc.) work shall be stopped to prevent disturbance and the Owner shall be notified immediately.

END OF SECTION 21 05 00

**SECTION 21 05 03 - BASIC MATERIALS AND
METHODS FOR FIRE SUPPRESSION**

I. GENERAL

A. DESCRIPTION

1. Type of piping for various systems shall be as specified herein.
2. All pipe shall be true and straight without sags or traps.

II. MATERIALS

A. FIRE PROTECTION PIPING

1. All fire sprinkler main and branch main piping shall be Schedule 40 steel pipe and fittings (do not use thin wall type pipe).
2. All interior dry pipe system shall be Schedule 40 steel pipe and fittings.
3. Where sprinkler piping is on the exterior and/or exposed to the weather, the piping shall be approved copper tubing.
4. Site water piping shall be AWWA C900 PVC and fittings with slip joints.
5. All piping shall be approved and listed for fire protection application.

B. PIPE FITTINGS

1. All pipe fittings shall be same as piping specified unless indicated otherwise.

C. PIPE SPECIALTIES

1. Dielectric unions shall be used between copper and iron pipe.

D. PIPE HANGERS AND SUPPORTS

1. This contractor shall furnish and install all foundations and supports required for his equipment unless indicated otherwise on the drawings.
2. This contractor shall furnish and install all escutcheons, inserts, thimbles, hangers, etc., required for the proper support and installation of his

equipment and piping. Cooperate with other trades in locating and placing these items.

3. Provide sleeves for all pipes passing through walls, floors, beams, etc. Sleeves passing through structural members shall be of cast iron or Schedule 40 steel pipe unless other material is approved by the Structural Engineer. Sleeves passing through nonstructural walls or floors shall be Schedule 10 galvanized iron. Joints between sleeves and pipes passing through floors shall be made watertight with plastic materials. Where pipes pass through floors shall be made watertight with plastic materials. Where pipes pass through waterproofing membrane, flashing sleeves shall be installed.
4. Provide chrome plated brass escutcheons wherever pipes pass through floors, walls or ceilings in exposed or finished areas.
5. All piping projecting from chases shall be rigidly supported in the wall or chase. Loosely supported piping or accessories will not be accepted.

E. MOTORS STARTERS AND ELECTRICAL WORK

1. The Sprinkler Contractor shall furnish to Electrical Contractor for installation, all motor starters, etc for each piece of motor driven equipment unless shown otherwise.
2. The Electrical Contractor shall install all motor starters, etc as furnished by the Sprinkler Contractor. The Electrical Contractor shall do all power wiring required for the installation of all fire protection equipment including equipment interlocking power and alarm wiring, etc. All work shall be done in accordance with the National Electrical Code requirements and with wiring workmanship, etc., as called for in the Electrical Specifications. The Sprinkler Contractor shall provide approved wiring diagrams of all equipment, controls, etc., to the Electrical Contractor for his installation. Coordinate all work to provide a complete system in working order. All wiring shall be plenum rated.

F. ACCESS PANELS

1. Furnish and install access panels where valves, dampers, etc., are concealed in walls, ceilings, floors or otherwise inaccessible. Panels shall be Milcor, Babcock, Larsen, MIFAB, Acudor, Nystrom or equivalent. All access panels shall be minimum 18 inches X 18 inches hinged with flush latch and lock. The panels shall be constructed of steel. Frame flange

shall be minimum 1-1/2 inches wide. Rated panels shall have U.L. rating for type wall or ceiling where located.

2. Access panels located in rated walls, floors, or ceilings shall be so rated and installed per manufacturer's recommendations to maintain rated integrity.
3. Access panels shall be primed and painted color as selected by Architect.

III. EXECUTION

A. FIRE PROTECTION PIPE

1. Perforated strap hangers shall not be allowed for any part of the hangers.
2. Mains, branches, and run outs: Pipe shall be cut accurately to measurements established at the building and shall be worked into place without springing or forcing. Care shall be taken not to weaken structural portions of the building. Above ground piping shall be run parallel with the lines of the building unless otherwise shown or noted on the drawings.
3. Expansion and contraction of piping: Allowance for expansion and contraction shall be made throughout.
4. Joints: Tubing shall be cut square, and butts shall be removed. Both inside of fittings and outside of tubing shall be well cleaned with steel wool before sweating. Care shall be taken to prevent annealing of fittings and hard drawn tubing when making connections. Installation shall be made by competent workmen in accordance with manufacturer's recommendation. Mitering of joints for elbows and notching of straight runs of pipe for tees will not be permitted. Joints for soldered fittings shall be made with a noncorrosive paste flux and solid string of wire solder. Cored solder will not be permitted.
5. Pipe sleeve, hangers, and fixture supports: These items shall be furnished and set and the contractor shall be responsible for their proper and permanent location.
 - a. Pipe sleeves - Install sleeves for all pipes passing through footings, floors, and walls. Clearance between sleeves and pipe covering and/or pipes shall be approximately 1/4 inch. Construction shall not be cut except where approved by the Architect. Where cutting of construction is permitted, the construction shall be repaired to

match its original condition. Sleeves shall not be installed in structural members except where indicated.

- 1) Install sleeves for pipes that pass through walls. Sleeves that pass through walls shall be cut flush with surfaces. The space between sleeves and pipe or covering shall be sealed with graphite packing and synthetic rubber caulking compound.
 - 2) Install sleeves where pipes pass through waterproofing membrane. The sleeves shall be provided with an integral flashing flange or a clamping device to which a 4 pound lead flashing shield shall be clamped or soldered. The shield shall extend 12 inches from the pipe and shall be thoroughly mopped into the membrane. The space between the sleeve and pipe shall be made watertight by inserting an oakum gasket, filling the remaining space with lead, and thoroughly caulking.
 - b. Threaded pipe - Support pipes at 7 foot intervals.
 - c. Copper tubing - Support tubing at not more than 5 foot intervals. Hangers for copper tubing except where protective shields are installed shall have proper size rings to suit outside diameter of tubing and the hangers or supports shall be copper or copper plated at contact surfaces.
 - d. Underground piping - Lay pipe on a firm bed for its entire length, except where support is otherwise provided.
 - e. Vertical piping - Supports shall be at each floor. Horizontal piping - Hangers and supports shall be installed at locations not more than 3 feet from the end of each run out. A hanger shall be installed not over 1 foot from each change in direction of piping.
6. Unions: Make connections to equipment and branch mains with unions. Provide non-conducting type connections wherever jointing dissimilar metals in open systems. Brass adapters and valves are acceptable.
 7. Provide drain valves at main shutoff valves, low points of piping and apparatus.

B. SPRINKLER HEADS

1. Sprinkler heads shall be located at the center of ceiling tile (square tile) or equidistant quarter points (rectangular or non-square tile).

END OF SECTION 21 05 03

SECTION 21 05 12 - FIRE PROTECTION SYSTEM

I. GENERAL

A. GENERAL

1. The General Provisions Section of the Specifications is a part of the Fire Protection System Specification and applies same as if herein included.

B. SCOPE OF WORK

1. Furnish all materials, labor, tools, equipment and working plans to install and place in operation the complete Fire Protection System (Automatic wet pipe and dry pipe sprinkler system) for the building areas as herein specified. The Sprinkler Contractor shall be responsible for preparing the plans, calculations, and Property Insurance Association of Louisiana review of the system layout.

C. WORK INCLUDED

1. The work shall include but not be limited to the following: all interior piping and fittings; automatic sprinkler systems; alarm system and drain connections; testing and approval; and service fees and installation cost due the utility company.

D. PLANS AND DIAGRAM

1. Working plans (drawings) shall be prepared by the contractor before commencing fire protection installation. The working drawings (plans) shall be detailed and submitted by the contractor to the following for approval:
 - a. Local Fire Department
 - b. Property Insurance Association of Louisiana
 - c. State Fire Marshal.
2. After approvals of above have been attained, four (4) copies of the approved drawings shall be submitted to the Architect for review.

E. QUALIFICATIONS OF CONTRACTOR

1. The contractor shall be a qualified fire protection contractor, licensed by the State of Louisiana and directly engaged in the installation of automatic fire sprinkler systems and other fire protection equipment.

F. SPRINKLER SYSTEM

1. The Sprinkler Contractor shall hydraulically design the sprinkler system in accordance with the National Fire Protection Association Pamphlet No. 13 Plans and hydraulic calculations shall be approved by the governing agencies in Louisiana before forwarding to the Architect for approval.
2. When the installation of the sprinkler system has been completed, a letter of full approval shall be obtained from the State Fire Marshal and delivered to the Architect.
 - a. If there are any deficiencies listed in the State Fire Marshal letter, the contractor shall correct the deficiencies within 14 days in preparation for the State Fire Marshal re-inspection.

G. PERMITS, INSPECTIONS AND TESTS

1. All permits, fees, etc., for the installation, inspection, or construction of the work which are required by any authority and/or agencies having jurisdiction, shall be obtained and paid for by the contractor.
2. All inspections, examinations and tests required shall be arranged and paid for by the contractor as necessary to obtain complete and final acceptance of the Fire Protection System. The contractor shall deliver certificates of all such inspections to the Architect.

H. GUARANTEE

1. The entire fire protection installation shall be guaranteed for one year from date of acceptance against defective materials, equipment, and workmanship. The liability of the contractor under this guarantee is limited to repair or replacement of defective equipment, materials, or workmanship, and any damage done to the existing premises or contents. The guarantee period is to commence on the date of final acceptance of the installation by the Owner.

I. WATER SUPPLY

1. The Sprinkler Contractor shall be responsible for testing the local utility company water supply to determine the static pressure, residual pressure, and available flow in G.P.M. to determine the adequacy of the utility company water system.

2. The Sprinkler Contractor shall be responsible for assuring that the underground supply main is installed to meet requirements of NFPA codes for fire protection systems. The Sprinkler Contractor shall provide the NFPA materials and test certificates for the underground water supply.

J. APPROVED MANUFACTURERS

1. All components of the automatic sprinkler system indicated on plans or in these Specifications shall be as manufactured by GEM, Grinnel, Viking, Automatic Sprinkler Corp. of America, Reliable Automatic Sprinkler Company, Central Sprinkler Company, or approved equal.

II. MATERIALS

A. MATERIALS, EQUIPMENT, VALVES AND DEVICES

1. Materials and equipment shall be new and in perfect condition and shall be approved for the particular application intended.
2. All materials, equipment, valves and devices installed and/or furnished under this section shall be listed and/or approved for use in the fire protection installation by the authorities, agencies, codes and standards named in this section of the Specifications.
3. Refer to: Underwriters' Laboratories - Approved Fire Protection Equipment List; Factory Mutual Approved Equipment Manual.

B. PIPE AND FITTINGS

1. All fire protection system piping inside the building shall be installed by means of screwed, flanged or welded fittings as specified herein. Victaulic Coupling System also will be acceptable and may be used in areas where pipe is concealed.
2. All screwed fittings and pipe shall have threads cut to standard pipe thread dimensions.
3. Pipe shall be properly reamed after cutting of threads.
4. Joint compound, Crane Thread Lubricant or equal, shall be applied to male threads of the screwed pipe and fittings only.
5. Approved expansion joints or flexible couplings shall be provided as necessary.

6. Care shall be taken in making up pipe and fittings such that pipe does not extend into fitting sufficiently to reduce the waterway.
7. Automatic sprinkler pipe within building shall be Schedule 40 black steel pipe with welded outlets (approved thin wall type piping shall not be used unless prior approved in writing by Engineer).
8. Fittings for use in the automatic sprinkler system shall be a type specifically approved for use in sprinkler systems and shall be either standard weight malleable iron screwed fittings conforming to ASTM A 157, latest revision and ASA B16c, or extra heavy cast iron screwed fittings conforming to ASTM A 126, latest revision, Class A, ASA B16d.
9. Unions for use on above grade pipe, 2 inches and smaller, shall be 250 pound malleable iron screwed unions with brass seat.
10. Unions for use on above grade pipe larger than 2 inches shall be cast iron, screwed flanges, 125 pound flat face with 1/16 inch rubber-composition gasket.
11. All risers 3 inches or larger shall have a flanged joint at each floor.
12. Standard, one piece reducing fittings of approved design shall be used wherever a change in size is made. Changes in pipe size shall not be made by means of reducing flanges.
13. Bushings shall be used only where standard, one piece reducing fittings are not available and shall be subject to the following:
 - a. Bushings shall be of the face of flush type.
 - b. Bushings shall not be used in elbow fittings.
 - c. Bushings shall not be used when the reduction in size of the outlet is less than 1/2 inch.
 - d. Bushings shall not be used in more than one outlet of any tee or two (2) outlets of any cross fitting.

C. VALVES AND BOXES

1. All gate valves in supply pipes to automatic sprinklers shall be sealed open in a satisfactory manner.
2. All control, drain, test and alarm valves shall be provided with identification signs of the standard design adopted by the automatic sprinkler industry or as required by the agencies named in this section of the Specifications.

3. Gate valves in sizes 4 inches and larger shall be Crane Underwriters' Pattern No. 462-1/2 or equal, or No. 467 or equal, bronze mounted, cast iron flanged gate valve. Gate valves in sizes smaller than 4 inches shall be Crane No. 459 or equal Underwriters' Pattern, O.S. and Y., bronze screwed gate valve.
4. Globe valves in sizes 4 inches and larger shall be Crane No. 351 or equal O.S. and Y., bolted bonnet, bronze trimmed, iron body, flanged globe valve with renewable seat.
5. Globe valves in sizes smaller than 4 inches shall be Crane No. 7 or equal, bronze screwed globe valve with composition disc.
6. Globe valves shall be used as drain and test valves only.
7. Angle valves shall be smaller than 4 inches only and shall be Crane No. 17 or equal, bronze screwed angle with composition seat.
8. Angle valves shall be used as drain and test valves only.
9. Check valves in sizes 4 inches and larger shall be Underwriters' Pattern, Crane No. 375 or equal, bronze trimmed cast iron body, flanged swing check valve.
10. Check valves in sizes smaller than 4 inches shall be Crane No. 34 or equal, bronze screwed swing check valve with bronze disc.
11. Check valves 4 inches and larger shall be self-draining and shall be equipped with automatic drip.

D. SLEEVES AND ESCUTCHEONS

1. All piping passing through the exterior walls of the building shall be sealed and caulked and appropriately covered on both inside and outside of metal wall panels.
2. Pipes above ground shall be supported adequately by means of hangers or by wall or floor clamps. Hangers and clamps shall be fabricated from steel or iron by a manufacturer specializing in such articles and shall be standard types suitable for the conditions of installation, subject to the following qualifications:
 - a. Hangers shall have adjustable rod suspension members.
 - b. All hangers, rods and clamps shall be galvanized.

- c. Perforated strap hangers are prohibited.
- d. The standpipe piping shall be supported in a manner which will prevent vibration in the piping when the standpipe is in use.
- e. The automatic sprinkler piping shall be supported in accordance with NBFU Bulletin No. 13, latest revision.
- f. Suitable reinforced steel framing and supports shall be provided for all piping entering, exiting, or fastening to the metal panel walls of the building. Details of such supports shall be provided on the working drawings (plans) submitted for approval.

E. SPRINKLER HEADS

- 1. All side wall sprinkler heads, unless otherwise noted shall be regular 165 degree rating chrome plated bronze sprinkler heads. All sprinkler heads located in heat producing equipment shall have higher temperature rating.
- 2. All sprinkler heads installed in ceilings shall be concealed head pendant type sprinkler heads with white finish on flush ceiling cover plates. The sprinkler head itself shall have a temperature rating of 165 degrees Fahrenheit. Sprinkler heads shall be as manufactured by Central Sprinkler Company, Reliable, Star, Grinnel, Tyco Companies, Viking or approved equal.
- 3. All sprinkler heads installed in areas without ceilings shall be either upright or pendant type with wire guards. Sprinkler heads shall be located at the center of ceiling tile (square tile) or equidistant quarter points (rectangular or non-square tile) unless noted otherwise.
- 4. All sprinkler heads shall be UL approved.

F. ALARM VALVE

- 1. Furnish and install an approved wet/dry pipe alarm valve assembly with all necessary by-passes, pressure gauges and attachments required. Provide water motor mechanical alarm with retarding chamber. Alarm valve, alarm and accessories shall be as manufactured by Central, Grinnel, Viking, Reliable Automatic Sprinkler Company, Inc., or equal.

G. FIRE DEPARTMENT CONNECTION

- 1. Furnish and install a Siamese inlet and check valve with ball drip, with finish of chrome plated brass and lettering "STANDPIPE-AUTO SPKR." in raised cast form on surface.

2. Threading and sizing to match local fire department requirements.
3. Fire Department connection shall be a two-way type, location as shown on plans, Potter Roemer, Guardian, Croker, Elkhart Brass, JME Fire Equipment or equal. Finish shall be polish chrome plated or as selected by Architect.

H. STOCK OF SPARE SPRINKLERS

1. At the sprinkler entry, this contractor shall furnish to the Owner a stock of spare sprinkler heads. The quantity of spare heads shall be as per NFPA and the Property Insurance Association of Louisiana. Provide a wall-mounted cabinet next to sprinkler entry for storage of spare sprinklers. Spare sprinkler shall be furnished with one sprinkler head wrench for each type of sprinkler.

I. AIR COMPRESSOR

1. Furnish and install a riser mounted air compressor for use in pressurizing the dry pipe system. The air compressor shall be approved for use on fire protection systems and shall meet the requirements of NFPA.

III. EXECUTION

A. SCHEDULE OF WORK

1. Check with General Contractors bidding this work for information regarding the number of days required to complete with work.
2. The successful bidder shall work with other trades in preparing finished sprinkler drawings to avoid conflicts during installation and be sure to obtain the latest plan of building, air conditioning, lights, mechanical, etc., before preparing finished drawings.

B. IN PLACE CONSTRUCTION

1. The contractor shall cut holes in walls, ceilings, and floor where required. Holes in ceilings for 1 inch drop nipples to sprinkler heads shall be cut by this contractor.
2. Where holes are cut through walls or ceilings, there shall be a neatly cut hole in the proper size for the pipe and all pipe passing through the walls or ceilings shall have a ceiling or wall plate on this pipe that will completely cover any sign of the hole cut in walls or ceilings.

3. The ceiling and wall plates, where required, shall be Grinnel Company, Inc., Fig. No. 395, or equal.

C. PROTECTION OF EQUIPMENT AND MATERIALS

1. The contractor shall at all times take such precautions as may be necessary to properly protect all equipment and materials from damage; failure on the part of the contractor to comply with the above, to the entire satisfaction of the Architect, will be sufficient cause for rejection of the particular piece of equipment in question.

D. TESTING

1. All sprinkler piping after installation shall be tested at a minimum of 200 psi hydrostatic pressure for a period of 2 hours. This contractor shall notify Architect prior to testing piping.

E. FLUSHING OF PIPING

1. Prior to pressure testing, the sprinkler contractor shall flush all mains and branch mains with water until the water is clear of debris, oil, and any other matter.
2. Pipe all flushing drains away from building walls, walkways, roadways, parking lots, etc. Do not stain any finished surfaces with flushing water.

F. MAINTENANCE INSTRUCTIONS TO THE OWNERS

1. After installation of this system is completed and before it is accepted by the Owner, the Sprinkler Contractor shall instruct the maintenance personnel on the care and maintenance of this system. Included in these instructions shall be of the following:
 - a. Two (2) copies of NFPA No.13A, Care and Maintenance of Sprinkler System, shall be furnished to the Owner's maintenance personnel.
 - b. Normal conditions of the sprinkler system.
 - c. Weekly test of alarm valve.
 - d. Weekly test of water flow indicator.
 - e. Semi-annual test of alarm valve and water flow indicator.
 - f. Abnormal conditions and corrections.
 - g. Maintenance.

2. After the above instruction has been completed, this contractor shall notify the Architect by letter of such. This letter should state the name(s) of the individuals receiving instructions.

G. INSPECTIONS

1. For a period of one year after acceptance, this contractor shall make two (2) inspections on the sprinkler system. One shall be six months after acceptance and the other, one year after acceptance. This contractor shall furnish the Owner with all inspection certificates after each inspection and furnish the architect with two (2) copies of the inspection certificate. After one year, the Owner shall be responsible for arranging for two (2) inspections per year by a qualified Sprinkler Contractor.

END OF SECTION 21 05 12

SECTION 22 05 00 - GENERAL PROVISIONS FOR PLUMBING

I. GENERAL

A. DIVISION OF SPECIFICATIONS

1. For Bidder's convenience only, this Division of the Specifications is divided into the following parts:

22 05 00	GENERAL PROVISIONS FOR PLUMBING
22 05 03	BASIC MATERIALS AND METHODS FOR PLUMBING
22 07 00	PLUMBING INSULATION
22 10 00	PLUMBING
22 11 00	WATER SUPPLY
22 13 00	WASTE WATER DISPOSAL
22 16 00	NATURAL GAS PIPING/DISTRIBUTION

B. GENERAL CONDITIONS

1. The General Conditions of the Architectural Specifications along with supplementary conditions, special conditions, information to bidders, and any other pertinent information and documents shall apply the same as if repeated herein. The contractor shall review Architectural General Conditions. Where the requirements of Architectural General Conditions and these specs conflict for the contractor, the most stringent shall be applied.
2. Plumbing subcontractor shall be the sole source responsible party to furnish and install the plumbing system. Plumbing contractor shall be properly licensed to perform this work.
3. Wherever the word contractor is mentioned in Division 22 of these specifications, it is intended to mean the Plumbing Contractor as appropriate. These are sub-contractors to the General Contractor who has the contract with the owner. It is the General contractor who bears the responsibility to fulfill this part of the project (Division 22 – Plumbing) under the contract with the owner. The General Contractor shall be responsible for all costs associated with any and all bidding errors and omissions of the sub-contractor.

C. SCOPE OF WORK

1. Furnish labor, materials and equipment necessary to provide and install the complete plumbing portion of this contract, as called for herein and on accompanying drawings. Parts of the plumbing division may be bid separately or in combination at the contractor's option; however, it shall be the responsibility of the General Contractor to assure himself that all items covered in the Plumbing Division have been included if he chooses to accept separate bids.
2. Contractor shall refer to the Architectural, Structural, Mechanical and Electrical drawings and install all equipment, piping, etc., to meet building and space requirements. **No equipment shall be bid on or submitted for approval if it will not fit in space provided or coordinated with other trades involved on the project.**
3. It is the intention of these Specifications that all plumbing systems shall be furnished complete with all necessary valves, controls, insulation, piping, devices, equipment, etc., necessary to provide a satisfactory installation in working order and in accordance with all Federal, State and Local codes and ordinances.
4. Contractor shall visit the site and acquaint himself thoroughly with all existing facilities and conditions which would affect his portion of the work. Failure to do so shall not relieve the contractor from the responsibility of installing his work to meet conditions.
5. Lack of coordination shall not be acceptable and shall not be a reason for poorly installed work or additional cost to this trade or others on the project. All associated extra cost shall be borne by the contractor. The General contractor shall be responsible for all costs, time and liquidated damages associated with lack of coordination or poor coordination.

D. **LOCAL CONDITIONS**

1. Location and elevation of all services is based on information obtained from the Owner. However, this shall serve as a general guide only and the contractor shall visit the site and verify the location and elevation of this service to his own satisfaction in order to determine the amount of work required for the execution of the contract.
2. Contractor shall contact the various utility companies, determine the extent of their requirements and cooperate with the utility company in reaching a finished product. Contractor shall pay charges by Utility Company for extensions, connections, meter fees, street patching, etc.

3. In case major changes are required, this fact, together with the reasons therefore, shall be submitted to the Architect, in writing, not less than seven days before the date of bidding. Failure to comply with this requirement will make the contractor liable for any changes, additions and expenses necessary for the successful completion of the project.

E. CUTTING AND PATCHING

1. Initial cutting and patching shall be the responsibility of the General Contractor with the Plumbing Contractor responsible for laying out and marking any and all holes required for the reception of his work. No structural beams or joists shall be cut or thimble without first receiving the approval of the Architect/Engineer. After initial surfacing has been done, any further cutting, patching and painting shall be done at this contractor's expense.
2. Cutting and patching shall be done in such a manner that the surrounding work will be restored to its original condition.
3. The plumbing piping shall be run at proper slopes and without conflict with other trades. It may be necessary to penetrate beams, grade beams, footings and foundations. Install thimbles as required and of approved by the Structural Engineer and Architect.

F. CODES AND STANDARDS

1. The entire plumbing work shall comply with the rules and regulations of the City, Parish and State in which this project is being constructed including the State Fire Marshal and State Board of Health. All modifications required by these authorities shall be made without additional charge to the Owners. The Plumbing Contractor shall report these changes to the Architect and secure his approval before work is started.
2. In addition to the codes mentioned, all plumbing work and equipment shall conform to the applicable portions of the following Specifications, codes and regulations:
 - a. National Electric Code
 - b. National Fire Protection Association
 - c. American Society of Mechanical Engineers
 - d. Underwriters's Laboratories
 - e. American Gas Association
 - f. Energy Code for Commercial and High Rise Residential Buildings

- g. International Energy Conservation Code (LA)
 - h. International Building Code (LA)
 - i. International Plumbing Code with Louisiana Amendments
 - j. International Fuel Gas Code (LA)
- 3. Materials, equipment and accessories installed under this contract shall conform to all rules, codes, etc., as recommended by National Associations governing the manufacturer, rating and testing of such materials, equipment and accessories. Materials shall be new and of the best quality and first class in every respect. Whenever directed by the Architect, contractor shall submit a sample for approval before proceeding.
 - 4. Where laws or local regulations provide that certain accessories such as gauges, thermometers, relief valves and parts be installed on equipment, it shall be understood that such equipment be furnished complete with the necessary accessories whether or not called for in these Specifications.
 - 5. Unfired pressure vessels shall be built in accordance with the ASME Code and so stamped. Furnish shop certificates for each vessel.
 - 6. Material and equipment furnished or installed as part of these construction documents shall be installed and operated in strict accordance with the respective manufacturer's guidelines for installation and operating instructions. The manufacturer's guidelines shall become part of the construction documents.

G. MINOR DEVIATIONS

- 1. Plans and detail sketches are submitted to limit, explain and define conditions, specified requirements, pipe sizes and manner of erecting work. Structural or other conditions may require certain modifications from the manner of installation shown and such deviations are permissible and shall be made as required, but, specified sizes and requirements necessary for satisfactory operation shall remain unchanged. It may be necessary to shift pipes or to change the shape of and these changes shall be made as required. All such changes shall be referred to the Architect/Engineer for approval before proceeding. Extra charges shall not be allowed for these changes.
- 2. No structural beams or joists (concrete or steel) shall be cut or thimble without first receiving the approval of the Architect/Structural Engineer. After initial surfacing has been done, any further cutting, patching and painting shall be done at the Plumbing Contractor's own expense.

3. Contractor shall realize that the drawings could delve into every step, sequence or operation necessary for the completion of the project without drawing on the contractor's experience or ingenuity. However, only typical details are shown on the plans. In cases where the contractor is not certain about the method of installation of his work, he shall ask for details. Lack of details shall not be an excuse for improper installation. Submit installation shop drawings with manufacturer's details for review prior to installation.
4. In general, the drawings are diagrammatic and the contractor shall install his work in a manner so that interferences between the various trades are avoided. In cases where interferences do occur, the Architect/Engineer is to state which equipment, piping, etc., is to be relocated regardless of which item was first installed.

H. WORKMANSHIP

1. Workmanship shall be of highest grade, highest quality and all construction shall be done according to the best practice of the trade. Work shall be completed to satisfaction of the Architect/Engineer.

I. COORDINATION

1. Coordinate work of the different trades to avoid interferences between plumbing and all other work. All piping, ductwork, etc., shall be installed in lines as required to accomplish this end whether or not shown on the plans.
2. There will be a certain amount of work which must be coordinated with the Owner. This contractor shall coordinate required work with the Owner through the General Contractor using procedures acceptable to the Architect and Owner. The contractor shall maintain documentation of coordinated work.
3. This contractor shall coordinate and confirm that all equipment requiring electric service will be adequately and properly serviced by Electrical Contractor. Any conflicts shall be brought to the attention of the Architect/Engineer prior to ordering the equipment. **VERIFY ALL VOLTAGES WITH THE ELECTRICAL PLANS AND ELECTRICAL CONTRACTOR.**
4. This contractor shall coordinate the space clearances required for the plumbing system with the structure, ceilings, lights, ductwork, etc. In some cases, due to space limitations, it may be necessary to reroute piping

to meet the conditions of the project. Any rerouting shall be part of this project and done without any additional cost to the Owner. **DO NOT MAKE PIPING WITHOUT COORDINATION. Avoid conflicts with other trades.**

5. This contractor shall coordinate the installation of sewer lines with all parts of the structural foundation system and structural building systems. Provide sleeves through grade beams or concrete beams at all conflicts. All points of penetration of foundation shall be reviewed by the Architect/Engineer prior to rough-in. All sleeves shall be installed per the instructions and details of structural engineer.
6. All piping shall be run as high as possible with sleeves through concrete beams to avoid conflicts. This means the piping shall run in or through the structure unless approved otherwise by the Architect/Engineer.

J. **REVIEW OF MATERIALS**

1. Whenever manufacturers or trade names are mentioned in these plans or Specifications, the words "or approved equivalent" shall be assumed to follow whether or not so stated. Manufacturers or trade names are used to establish a standard of quality only and should not be construed to infer a preference. Equivalent products which meet the Architect's approval will be accepted; however, these requests for acceptance of products must be received by the Architect a minimum of ten days prior to bid date. Submission shall include manufacturer's name, model number, rating table and construction features. Upon receipt and checking of this submittal, the Architect will issue an addendum listing items which are approved as equivalent to those specified. The contractor shall base his bid solely on those items specified or included in the "Prior Approval Addendum" as no other item will be acceptable. Prior approval of a particular piece of equipment does not mean automatic final acceptance and will not relieve the contractor of the responsibility of assuring himself that this equipment is in complete accord with plans and Specifications and will fit into the space provided. Submit shop drawings on all items of equipment for approval as hereinafter specified.
2. Should a substitution or variation occur, the better quality or greater quantity of material or work shall be furnished. This also does not preclude other manufacturers if they meet the following criteria:
 - a. Product proposed for substitution shall be equal or superior to that specified in construction, efficiency, utility and function.

- b. Physical size of substitute brand shall not be greater than space provided for it.
- c. Profile of substitution shall be same concerning size, shape, indentations, recesses, etc.
- d. Complete illustrations, specifications and description of substitution shall be submitted for approval.
- e. Availability and proximity of manufacturer's service representative shall be factors considered in substitution approval.
- f. Substitution and/or variations shall be reviewed and allowed when there is no change in cost to the project and shall be made at the discretion of the Engineer.

K. SHOP DRAWINGS

- 1. The General Contractor shall submit plumbing submittal within 30 days of the date of the contract between owner and contractor or the date of notice to proceed as issued by the owner to the General Contractor. The mechanical submittals shall have been submitted to the General Contractor within 30 days after the construction contract has been signed. The General Contractor and his sub-contractors shall bear all responsibility for any extra costs or delays to late submittals of shop drawings.
- 2. Drawings shall be presented in a clear and thorough manner.
- 3. Details shall be identified by reference to sheet detail, schedule or room numbers shown on contract and drawings.
- 4. Drawings shall contain the following information:
 - a. Date.
 - b. Number of the drawing or revision.
 - c. Name of project or facility.
 - d. Name of contractor and subcontractor.
 - e. Clear identification of contents and location of work.
- 5. Preparation:
 - a. Clearly mark each copy to identify pertinent products or models.
 - b. Show performance characteristics and capacities.
 - c. Show dimensions and clearances required.
 - d. Show wiring or piping diagrams and controls.
 - e. Show weights and mounting data.

- f. Provide letter documentation confirming that all coordination with other trades effected have been done. This is especially necessary with the electrical requirements and rough-in requirements.
- 6. Manufacturer's standard schematic drawings and diagrams:
 - a. Modify drawings and diagrams to delete information which is not applicable to the work.
 - b. Supplement standard information to provide information specifically applicable to the work.
- 7. Office samples shall be of sufficient size and quantity to clearly illustrate:
 - a. Functional characteristics of the product, with integral related parts and attachment devices.
 - b. Full range of color, texture and pattern.
- 8. Equipment shop drawing shall be prepared by the contractor/supplier. These shop drawing shall include the manufacturer's performance data and installation manuals. In addition, the shop drawings shall show the installation specific to this project.
- 9. Assemble certificates, executed by each of the respective manufacturers, suppliers, and subcontractors.
- 10. All submittals shall be submitted prepaid and in ample time for review before installation.
- 11. Six (6) copies of each submittal shall be submitted to the Architect.
- 12. These shop drawings shall be supplied as part of this contractor's contract. Any drawings not approved shall be resubmitted until approved. **Submit all shop drawings at the same time. No separate items will be accepted.**
- 13. Time necessary for review of samples, certificates, test reports, and shop drawings is at least 30 calendar days after receipt of the item. All materials installed in the work shall match the reviewed submittals. After a submission has been reviewed, no substitutions will be permitted without written approval by the Architect.
- 14. The Architect's/Engineer's review of shop drawings shall not relieve the contractor from the responsibility of incorrectly figured dimensions or any other errors that may be contained in these drawings. The omission from the shop drawings or specifications, even though approved by the

Architect, shall not relieve the contractor from furnishing and erecting same.

15. Any delays caused by contractor not submitting shop drawings within a timely manner shall be the problem of the responsible subcontractor and the General Contractor.

L. UTILITIES

1. Connect all utilities at the points indicated on the drawings and extend such utilities to the building and to equipment or facilities requiring same.
2. Contractor shall pay all service and connection charges required by utility companies and/or site conditions (offsets, conflict boxes, etc.).
3. Contractor shall include all costs required by utility companies to extend utilities to the site. It is the responsibility of the contractor to obtain these fees from the utility companies and include those costs in the bid.

M. REPAIRING ROADWAYS AND WALKS

1. Where this contractor cuts or breaks roadways or walks to lay the piping, he shall repair or replace these sections to meet the Architect's approval. Repair of public roadways and highways shall be done as per the Federal, State or Local agencies having jurisdiction. Contractor shall obtain and pay for all permits.

N. EXCAVATION AND BACK FILL

1. Trench and excavation work shall include excavating, preparing of trenches, and backfilling as specified. Contractor shall install caution tape 12 inches above all piping, conduit, etc., as backfilling processes.
2. Trench and excavation work shall not include pavement breaking, cutting of holes through foundation walls and floors, removal of obstructions, relaying and/or repairing of floors, and repaving, which work shall be the responsibility of the General Contractor.
3. Contractor shall do all necessary trenching, excavation and backfilling for the proper installation of his work. Care shall be taken not to excavate below depth required, that trench beds are well rounded and that ground under pipe line is firm and secure before any pipe is laid. Trenches shall be excavated where bells of pipe occur in order to insure a pipe resting on the entire length of the bottom of the trench.

4. Unless otherwise noted, minimum cover over underground lines shall be 2-1/2 feet, except under streets and parking lots where minimum cover shall be 3 feet.
5. The width of the trench shall be sufficient to permit thorough compaction of the backfill under and around the pipe but not exceeding the external diameter of the pipe by more than 12 inches. Excavation for pipes shall be by hand and/or machine and as specified herein and shall confirm to the lines and elevations indicated on the plans.
6. The pipe shall be placed on a uniformly firm and compacted bed of sand, carefully shaped to support the pipe at the desired grade and so that any reaction will be distributed as nearly uniform as possible over a horizontal width of not less than six-tenths (6/10) of the outside diameter and all possibility of concentration of the reaction at or near the vertical diameter eliminated. The bed shall be shaped as to fit the lower part of the pipe exterior for at least 10 percent of its overall height.
7. The pipe shall be placed on a firm foundation. Any muck or other objectionable material found during excavation and preparation of the bed shall be removed and replaced with suitable bed material directed by the Architect.
8. All trenches and excavation shall be backfilled in a reasonable time after the pipes are installed unless otherwise directed by the Architect. Special care shall be taken in placing the backfill and extra care shall be used to obtain compaction under and along sides to the top of the pipe.
9. The backfill shall be placed in loose layers not exceeding 6 inches in depth under and around the pipe and not exceeding 8 inches over the pipe. Each layer shall be compacted to the compaction requirements as specified by the Architect.
10. Compaction shall be by hand and pneumatic tampers and the successive layers shall be added and compacted until the trench is completely filled and brought to elevation as directed. Back-filling shall be done in such a manner as to avoid injurious top or side pressures on the pipe.
11. Improper backfilling and compacting shall be cause to have the trench opened to expose the pipe for inspection then properly backfilled and compacted with fill material.

12. Where trenching is for piping, the bottom of the trench shall have minimum 95 percent compaction and shall be bedded with minimum 12 inches compacted sand, crushed stone or shell on undisturbed soil (minimum 95 percent compaction).

O. MATERIALS

1. Work materials shall be new and the best of their respective kinds, and shall bear the label of NFPA, ASME Code, AGA, and UL where such standard has been established for the particular item of equipment used.
2. Where project is defined as “Buy American”, the contractor shall follow laws and policies governed by this definition as indicated in architectural specifications. Submit documentation that product complies. Include with equipment submittal.

P. MATERIAL STORAGE

1. General: Provide space for storage of material and equipment at ground level. Roof surfaces shall not be used for storage of materials or equipment. Any storage within the building shall be approved by the Architect/Engineer prior to use of the space.
2. Exterior: Pipe, fitting, or other materials stored outside of building shall be set on wood or steel racks or platforms inside storage container units. All necessary provisions shall be made to keep water and debris away from such stored material. Ends of pipes and valves shall be kept sealed until used.
3. Warehousing: Equipment subject to rusting shall be kept warehoused until just prior to setting. If necessary the warehouse shall have climate controlled conditions.
4. Offsite warehousing shall be approved by the Architect and Owner only.
5. Any warehousing used shall be approved by the Owner and an insurance certificate naming the Owner as insured shall be provided to the Owner.

Q. GROUND AND CHASES

1. Contractor shall see that all required chases, sleeves, grounds, holes and accessories necessary for the installation of his work are properly built in as the work progresses; otherwise he shall bear the cost of providing them.

R. MACHINERY GUARDS

1. Contractor shall provide v-belt guards for each v-belt drive or other hazardous drive. Guard shall enclose the drive entirely and shall have a hole for taking tachometer reading.

S. SPECIAL TOOLS

1. Special tools required for proper operation or maintenance of any equipment provided under this contract shall be delivered to the Owner at the completion of the project.

T. FILL AND CHARGES FOR EQUIPMENT

1. Fill and charge with materials or chemicals all devices or equipment as required to comply with the manufacturer's guarantee or as required for proper operation of the equipment.
2. This contractor shall flush systems as required per local and state jurisdictions and equipment/material manufacturer's guideline. (Chlorination, chemical treatment, etc.)

U. EQUIPMENT ACCESS

1. Large equipment to be installed in building, which is too large to permit access through doorways, shall be brought to the job by the contractor and placed before enclosing structure. Equipment shall be cribbed up from the floor by the contractor and covered where necessary or directed.

V. EQUIPMENT IDENTIFICATION

1. Stenciling: All items of major plumbing equipment (water heaters, pumps, starters, mixing valves, etc.) shall be neatly and clearly stenciled in letters not less than 1 inch high, with the same designation as appears on drawing. Location and color of such stenciling shall be appropriate for ready identification and/or as directed by the Architect. One set of compatible metal interlocking stencil letters and numbers shall be turned over to the Owner at the completion of the job. At contractor's option engraved plastic adhesive tags may be used. Tags used outdoors shall be listed for such use.
2. Pipe Coding: All piping, etc., both insulated and bare, shall be color coded with a general purpose pipe marker for interior locations and a 6 inch enamel painted band for exterior locations, and stenciled as to service

and characteristics on the 10 foot centers and/or as directed. Directional arrows not less than 1/2 inch wide and not less than 6 inches long shall be permanently stenciled on each line at each stencil location. Stenciling shall be located such that it is clearly visible from floor or adjacent service platform. Coding shall be as per schedule approved by Owner through submittal to Architect. At contractor's option, pre-manufactured vinyl pipe labels and directional arrows may be used but shall be banded on either end to secure to pipe.

3. Valve tags shall be installed on all valves controlling building zones, areas, or equipment. Valve tags shall be 2 inch diameter brass stenciled with valve number. A framed list of valves with associated numbers, sizes and locations shall be mounted in the building as directed by Architect.

W. TEMPORARY USE OF EQUIPMENT

1. The permanent equipment installation shall not be used for temporary purposes by the contractor for temporary conditioning of the building during construction.
2. Acceptable Use Without Specific Authorization: Temporary use shall not be construed to mean "bumping" of electric motors on equipment to verify rotation direction nor short time operation of systems for test purposes.

X. CLEANING AND ADJUSTING

1. Upon completion of his work, the contractor shall clean and adjust all equipment, controls, valves, etc. Clean all piping, etc., and leave entire installation in good working order.

Y. PAINING

1. This contractor shall obtain the services of a painting sub-contractor as part of his contract with the General Contractor for all painting.
2. General: Except for standard factory finishes, all pipe, pipe covering, equipment, supports, hangers, etc., exposed inside and outside building or in equipment room shall be painted. This contractor shall prepare surface of material to receive first coat of paint. All subsequent coatings shall be prepared by Painting Subcontractor. Requirements covering paints, workmanship and preparation of surfaces as stated in Architectural Specifications shall govern. Color coding shall be approved by Architect (submit color samples). All submittals for review shall be through Architect.

3. Damage: Where standard equipment factory finishes have been damaged or scratched, the damaged area shall be repaired or replaced by the contractor to match the original finish.
4. Preparation: Thoroughly clean surfaces of all rust, scale, cement, and dirt from all equipment, piping or other work installed and leave ready for finish painting.
5. All exposed piping shall be painted. Paint with two (2) coats of paint. The color shall be industry standard color coding. Submit color code chart with sample color chips to Architect for review prior to starting work.

Z. FIRESTOPPING

1. Penetrations through rated construction shall be sealed with a material capable of preventing the passage of flames and hot gases when tested in accordance with ASTM-EB14.
2. Notify Architect for inspection of all completed fire and/or smoke barrier walls before any construction is installed that may conceal the firestopping material installation.
3. Access to random selected areas may be required by the architect at the time of final inspection should notification not be given.
4. Provide detailed instructive cutsheets of fire penetration sealing system (firestopping) used to the architect at the time of inspection. Random selective sampling by the contractor will be observed by the architect and State Fire Marshal.

AA. NOISE VIBRATION

1. General: Take the utmost precautions in the installation of the equipment, piping systems to prevent noise and vibration transmission.
2. Isolation of equipment: Equipment that would tend to cause noise or vibration shall be isolated to prevent noise transmission to the building or to other equipment.
3. Equipment Connections: Piping, conduit, or other connections to equipment shall be isolated. The contractor shall be responsible for the prevention of noise and vibration transmission through these connections to equipment.

BB. PERMITS, INSPECTIONS AND TESTS

1. Contractor shall obtain and pay for permits, fees, etc., for the installation, inspection, service connections, verifying location or construction of the work which are required by any authority and/or agencies having jurisdiction.
2. Contractor shall arrange and pay for inspections, examinations and tests required to obtain complete and final acceptance of all plumbing systems. Contractor shall deliver certificates of all such inspections to the Architect.
3. Contractor shall notify Architect and local governing authorities before any tests are made and tests are not to be drawn off a line covered or insulated until examined and approved by the authorities. In the event defects are found, these shall be corrected and the work shall be retested.
4. Prior to requesting final inspection by the Architect, the contractor shall have a complete coordination and adjustment meeting of all of his subcontractors directly responsible for the operation of any portion of the system. At the time of this meeting, each and every sequence of operation shall be checked to assure proper operation. Notify the Architect in writing ten days prior to this meeting instructing him of the time, date and whom you are requesting be present. This project shall not be accepted until the above provisions are met to the satisfaction of the Architect.

CC. TRAINING OF MAINTENANCE PERSONNEL

1. Contractor shall provide on the job training for Owner's personnel upon completion of the work including testing and adjustment. Minimum 8 hours of onsite training shall include maintenance checks, lubrication of components, adjustment of control set points, and troubleshooting techniques.

DD. OPERATION AND MAINTENANCE INSTRUCTIONS

1. Provide Owner with four (4) copies of printed instructions indicating various pieces of equipment by name and model number complete with parts lists and maintenance and repair instructions. This information shall be bound in plastic covered notebooks. Submit the manuals to the Architect for approval.
2. Include all warranty certificates or statements in a separate section of the manuals. Provide all materials and test certificates for the final inspection.

3. Provide three (3) sets of DVDs of the operation and maintenance manuals.

EE. GUARANTEE

1. Contractor shall guarantee all materials, equipment and workmanship for a period of one year from the date of final acceptance of the project. This guarantee shall include furnishing of all labor and material necessary to make any repairs, adjustments or replacement of any equipment, parts, etc., necessary to restore the project to first class condition. This guarantee shall exclude only the changing or cleaning of filters.
2. If the contractor's office is in excess of a 50 mile radius of the project, he shall appoint a local qualified contractor to perform any emergency repairs or adjustments required during the guarantee period. The contractor appointed to provide emergency services shall be submitted to the Architect for his approval.

FF. WARRANTIES

1. Assemble warranties executed by each of the respective manufacturers, suppliers, and subcontractors into a warranty book and prepare a table of contents.
2. Two (2) original signed copies of each warranty are required.
3. Provide complete information for each item including:
 - a. Product and work item.
 - b. Local supplying firm or manufacturer's dealer, with name of principal, address and telephone number.
 - c. Scope of warranty.
 - d. Date of beginning of warranty.
 - e. Duration of warranty.
 - f. Provide information for Owner:
 - g. Proper procedure to evoke the warranty in case of failure.
 - h. Instances which might affect the validity of the warranty.
 - i. Contractor, name of responsible principal, address and telephone number.
 - j. All contractors and manufacturers equipment warranties shall start at the acceptance of the project by the Owner.
 - k. Provide owner with contact information for warranties which extend beyond one year.

GG. RECORD DRAWINGS

1. Contractor shall maintain two (2) sets of drawings of the original construction documents to utilize as markup sets to record field modifications from original construction documents. Once approval has been gained from the Architect, the contractor shall record these variances on the two (2) sets in a neat and readable manner. Noted shall be sizes, locations, changes in directions, etc. with distances dimensioned from columns, walls, inverts, etc. The maintenance and cost of these documents shall be the responsibility of the contractor.

HH. DEMOLITION

1. This contractor shall do all demolition as shown on the plans. The contractor shall make the areas ready for the new construction work. All demolition debris, piping, equipment, etc., shall be removed from the site by this contractor. All demolition work shall be scheduled through the General Contractor to prevent interruption of any existing services. Do not start any demolition which would interrupt the building operation without scheduling with the Owner (schedule through the General Contractor).
2. The Owner shall retain first salvage rights to anything within the demolition area. If the Owner selected an item to be retained, then this contractor shall remove it with care and deliver the item to the Owner designated location on site. Anything not retained by the Owner shall become the property of the contractor and be removed from the site.

II. MATERIALS CONTAINING HAZARDOUS SUBSTANCES OR COMPONENTS

1. This contractor shall not provide any material or component of equipment which contains asbestos, lead based paint or PCBs. The contractor shall provide certificates or manufacturer's statements/letters to show that the products and/or building materials do not contain asbestos, lead based paint or PCBs.
2. If any product or building material is found to contain asbestos, lead based paint or PCBs, the contractor shall bear all cost for removal, abatement, and disposal of materials in accordance with all state and federal regulations. The contractor shall install replacement materials to the satisfaction of the Architect at no additional cost to the project.
3. During the construction, if the contractor suspects that any material in the building contains or is a hazard material (asbestos, lead, PCB, mercury,

etc.) work shall be stopped to prevent disturbance and the Owner shall be notified immediately.

END OF SECTION 22 05 00

SECTION 22 05 03 - BASIC MATERIALS AND METHODS FOR PLUMBING

I. GENERAL

A. DESCRIPTION

1. Type of piping for various systems shall be as specified herein.
2. All pipe shall be true and straight without sags or traps.

II. MATERIALS

A. SANITARY SEWER WASTE AND VENT LINES

1. All sanitary sewer waste and vent lines above and below building slab shall be constructed of service weight bell and spigot cast iron pipe and fittings. Where space requirements do not allow the use of the above materials, government type DWV copper pipe shall be used. All cast iron pipes shall comply with Commercial Standards CS 188-59 coated with tar inside and out and marked with manufacturer's identification and proper weight classification. Joints shall be made with neoprene gaskets.
2. At contractor's option, all sanitary sewer waste and vent lines may be Schedule 40 PVC plastic lines and fittings with solvent weld joints (solid core allowed only; foam or cell core not acceptable).
3. Sanitary sewer lines exterior of building (5 feet from building) shall be constructed of PVC Schedule 40 type "DWV" plastic pipe and fittings (solid core allowed only; foam or cell core not acceptable).
4. At contractor's option, sanitary sewer vent lines above grade may be constructed of "no hub" service weight cast iron pipe with neoprene/stainless steel clamp couplings.

B. DOMESTIC WATER PIPE/WATER HEATER RELIEF PIPE/EQUIPMENT DRAIN PIPE/TRAP PRIMER

1. All domestic cold water lines/hot water lines within building, water heater relief lines and equipment drain piping shall be government type "L" hard copper water tube of standard weight and thickness, unless indicated otherwise. Use 95-5 "lead free" solder on all piping above slab. Use Silfos 1000 degrees Fahrenheit solder on all piping beneath slabs. "Press-Fit" or "Pro-Press" piping is not acceptable.

2. Site water piping (beyond 5 feet of building footprint) shall be Schedule 40 PVC pipe and fittings solvent weld joints (solid core allowed only; foam or cell core not acceptable).

C. PIPE FITTINGS

1. All pipe fittings shall be same as piping specified unless indicated otherwise.
2. Fittings for domestic water lines shall be solder type wrought copper, Nibco or equivalent.

D. PIPE SPECIALTIES

1. Dielectric unions shall be used between copper and iron pipe.

E. PIPE HANGERS AND SUPPORTS

1. This contractor shall furnish and install all foundations and supports required for his equipment unless indicated otherwise on the drawings.
2. This contractor shall furnish and install all escutcheons, inserts, thimbles, hangers, etc., required for the proper support and installation of his equipment and piping. Cooperate with other trades in locating and placing these items.
3. Provide sleeves for all pipes passing through walls, floors, beams, etc. Sleeves passing through structural members shall be of cast iron or Schedule 40 steel pipe unless other material is approved by the Structural Engineer. Sleeves passing through nonstructural walls or floors shall be of Schedule 10 galvanized iron. Joints between sleeves and pipes passing through floors shall be made watertight with plastic materials. Where pipes pass through floors shall be made watertight with plastic materials. Where pipes pass through waterproofing membrane, flashing sleeves shall be installed.
4. Provide malleable iron split ring hangers with rod supports throughout. Strap hangers or wire will not be accepted. Maximum spacing of hangers for cast iron pipes shall be 5 feet; for other than soil, use 10 feet.
5. Provide galvanized iron shields between hangers and pipe covering.
6. Provide chrome plated brass escutcheons wherever pipes pass through floors, walls or ceilings in exposed or finished areas.

- 7. All piping projecting from chases shall be rigidly supported in the wall or chase. Loosely supported piping or accessories will not be accepted.

F. VALVES AND UNIONS

- 1. Furnish and install all valves, unions, stops, connections, etc., shown on plans and necessary to make a complete system in working order. Provide valves on inlet and outlet of all equipment and fixtures and on branch lines to fixtures or groups of fixtures.
- 2. All valves, unions, etc., where pipe is chrome plated shall have similar finish. All exposed supplies to plumbing fixtures shall be chrome plated.
- 3. Ball valves shall be as manufactured by Milwaukee Valve (MV), Watts, Stockham, Powell, NIBCO, Neles-Jamesbury or Hammond.

	<u>2" and Smaller</u>	<u>2-1/2 to 4"</u>	<u>Over 4"</u>
Watts	Series B-6800	Series G-4000	Series G-4000
Neles-Jamesbury	Series 4000	Full Port Series	Full Port Series
Milwaukee Valve	BA-300	F-20CS	F-20CS

- 4. All valves over 2 inches shall be flanged type and full port type. All valves 2 inches and smaller shall be screw type, sweat type or flanged type as appropriate for type of pipe.

G. MOTORS STARTERS AND ELECTRICAL WORK

- 1. The Plumbing Contractor shall furnish to Electrical Contractor for installation, all motor starters, start-stop push buttons and pilot lights for each piece of motor driven equipment unless shown otherwise.
- 2. The Electrical Contractor shall install all motor starters, start-stop push buttons and pilot lights as furnished by the Plumbing Contractor. The Electrical Contractor shall do all power wiring required for the installation of all equipment including equipment interlocking power wiring, etc. All work shall be done in accordance with the National Electrical Code requirements and with wiring workmanship, etc., as called for in the Electrical Specifications. The Plumbing Contractor shall provide approved wiring diagrams of all equipment, controls, etc., to the Electrical Contractor for his installation. Coordinate all work to provide a complete system in working order. All wiring shall be plenum rated.
- 3. All motors for the plumbing equipment shall be of the 40 degrees Celsius rise type and shall be furnished and installed by the Mechanical

Contractor. All motors shall be wound for +/- 10 percent of the specified voltage. Motors shall be voltages indicated on drawings. All motors shall have copper windings, class F insulation and shall be rated for continuous duty service. All three-phase motors shall be inverter-duty type motors.

4. All electrical equipment shall have UL label or ETL label and shall meet the standards of the National Electrical Code and NEMA.
5. Plumbing contractor shall provide and install transformers and low voltage wiring (below 120-1-60) from transformer to equipment. Electrical contractor shall provide and install power wiring to transformers.

H. ACCESS PANELS

1. Furnish and install access panels where valves, dampers, etc., are concealed in walls, ceilings, floors or otherwise inaccessible. Panels shall be Milcor, Babcock, Larsen, MIFAB, Acudor, Nystrom or equivalent. All access panels shall be minimum 18 inches X 18 inches hinged with flush latch and lock. The panels shall be constructed of minimum 16 gauge steel. Frame flange shall be minimum 1-1/2 inches wide. Rated panels shall have U.L. rating for type wall or ceiling where located.
2. Access panels located in rated walls, floors, ceilings, shall be so rated and installed per manufacturer's recommendations to maintain rated integrity.
3. Steel access panels shall be primed and painted color as selected by Architect.

III. EXECUTION

A. SANITARY SEWER PIPE

1. Pipe ends shall be square cut. Ends of pipes shall be reamed and shall be wiped clean to remove cuttings. Before installation, pipe shall be stood on end and tapped sharply to remove cuttings and other foreign materials from interior. Pipe shall be thoroughly cleaned inside and outside. Bending or springing of pipe shall not be permitted.
2. Various service pipes, valves, fittings, etc., running parallel with each other and near together shall be in line with each other and shall be kept at a sufficient distance from each other and other work to permit no less than 1/2 inch between finished coverings on different services.

3. Each contractor shall furnish all foundations, structural or pipe supports indicated, called for specifically or that may be required to support his particular equipment and material unless hangers are definitely indicated as being furnished by others. All horizontal runs of piping shall be securely supported by pipe hangers spaced at not more than 10 feet apart and closer when necessary to prevent sagging. Sewer waste and vent lines shall be supported every 5 feet.
4. Perforated strap hangers shall not be allowed for any part of the hangers.
5. Drainage and vent pipes: The main vertical soil and waste vent shall be extended full size through the wall. Cast-iron pipe inside the building shall be extended 6 inches above the floor.
6. Fittings: Changes in pipe size on soil, waste, and drain lines shall be made with reducing fittings or recessed reducers. All changes in direction shall be made by the appropriate use of 45 degree wyes, long or short sweep 1/4 bends, 1/6, 1/8, or 1/16 bends, or by a combination of those or equivalent fitting, except that single and double sanitary tees may be used in drainage lines only where the direction of flow is from horizontal to vertical. Short sweeps not less than 3 inches in diameter may be used where the change in direction of flow is either from horizontal to vertical or from vertical to horizontal.
7. Pipe sleeve, hangers, and fixture supports: These items shall be furnished and set and the contractor shall be responsible for their proper and permanent location.
 - a. Pipe sleeves - Install sleeves for all pipes passing through footings, floors, and walls. Clearance between sleeves and pipe covering and/or pipes shall be approximately 1/4 inch. Construction shall not be cut except where approved by the Architect. Where cutting of construction is permitted, the construction shall be repaired to match its original condition. Sleeves shall not be installed in structural members except where indicated. Sleeves are not required for wall hydrants.
 - 1) Install sleeves for pipes that pass through walls. Sleeves that pass through walls shall be cut flush with surfaces. The space between sleeves and pipe or covering shall be sealed with graphite packing and synthetic rubber caulking compound.
 - 2) Install sleeves where pipes pass through waterproofing membrane. The sleeves shall be provided with an integral flashing flange or a clamping device to which a 4 pound

lead flashing shield shall be clamped or soldered. The shield shall extend 12 inches from the pipe and shall be thoroughly mopped into the membrane. The space between the sleeve and pipe shall be made watertight by inserting an oakum gasket, filling the remaining space with lead, and thoroughly caulking.

- b. Threaded pipe - Support pipes at 7 foot intervals.
 - c. Copper tubing - Support tubing at not more than 5 foot intervals. Hangers for copper tubing except where protective shields are installed shall have proper size rings to suit outside diameter of tubing and the hangers or supports shall be copper or copper plated at contact surfaces.
 - d. Underground piping - Lay pipe on a firm bed for its entire length, except where support is otherwise provided.
 - e. Vertical piping - Supports shall be at each floor. Horizontal piping - Hangers and supports shall be installed at locations not more than 3 feet from the end of each run out. A hanger shall be installed not over 1 foot from each change in direction of piping.
- 8. Make connections to equipment and branch mains with unions.
 - 9. Provide drain valves at main shutoff valves, low points of piping and apparatus.
 - 10. Install each fixture with trap, easily removable for servicing and cleaning. Each trap shall be placed as near the fixture as possible, and no fixture shall be double trapped. At completion, thoroughly clean plumbing fixtures and equipment.
 - 11. Fixture connections: Connections between earthenware fixtures and flanges on soil pipes shall be made absolutely gas tight and water tight with a closet-setting compound or gasket. Bolts shall be not less than 1/4 inch in diameter and shall be equipped with chromium-plated nuts and washers.
 - 12. Test sanitary drainage, condensate drains and vent systems with water or air in accordance with requirements of the State Sanitary Code, International Plumbing Code and all applicable local codes. Water test may be applied to entire drainage systems or sections of systems. All openings shall be tightly closed in section to be tested except at highest opening. All portions of systems shall be subject to a minimum of 10 feet head of water. Water must have been in the system 2 hours prior to inspection. Air test in accordance with the Plumbing Code may be used at contractor's option.

13. Sanitary sewer or storm drain pipe penetrating concrete slabs shall be wrapped with foam insulation tape.

B. DOMESTIC WATER PIPE

1. Perforated strap hangers shall not be allowed for any part of the hangers.
2. Mains, branches, and run outs: Piping shall be installed as indicated on the drawings. Pipe shall be cut accurately to measurements established at the building and shall be worked into place without springing or forcing. Care shall be taken not to weaken structural portions of the building. Above ground piping shall be run parallel with the lines of the building unless otherwise shown or noted on the drawings. Branch pipes from service lines may be taken from top, bottom, side or main, using such crossover fittings as may be required by structural or installation conditions. Service pipes, valves, and fittings shall be kept a sufficient distance from other work and other services to permit not less than 1/2 inch between finished covering and other work and not 1/2 inch between finished covering on the different services. No water pipe shall be made with reducing fittings. Use of long screws and bushings will not be permitted. Slope water pipe 1 inch in 40 feet and arrange to drain at low point.
3. Expansion and contraction of piping: Allowance for expansion and contraction shall be made throughout. Sufficient flexibility shall be provided on all branch run outs from mains to risers to provide for expansion and contraction of piping. Flexibility shall be provided by installing one or more turns in the line so that the piping will spring enough to allow for expansion without straining.
4. Joints: Tubing shall be cut square, and butts shall be removed. Both inside of fittings and outside of tubing shall be well cleaned with steel wool before sweating. Care shall be taken to prevent annealing of fittings and hard drawn tubing when making connections. Installation shall be made by competent workmen in accordance with manufacturer's recommendation. Mitering of joints for elbows and notching of straight runs of pipe for tees will not be permitted. Joints for soldered fittings shall be made with a noncorrosive paste flux and solid string of wire solder. Cored solder will not be permitted.
5. Valves: Valves shall be provided on all supplies to fixtures as specified under type of fixture and fixture trimmings. Valves indicated in connection with run outs, risers, branches, and mains shall be in

accordance with this specification. No valve shall be installed on any lines with its stem below the horizontal. All valves shall be gate valves unless otherwise specified or indicated. Provide drain valves at main shut-off valves, low points of piping and apparatus.

6. Pipe sleeve, hangers, and fixture supports: These items shall be furnished and set and the contractor shall be responsible for their proper and permanent location.
 - a. Pipe sleeves - Install sleeves for all pipes passing through footings, floors, and walls. Clearance between sleeves and pipe covering and/or pipes shall be approximately 1/4 inch. Construction shall not be cut except where approved by the Architect. Where cutting of construction is permitted, the construction shall be repaired to match its original condition. Sleeves shall not be installed in structural members except where indicated. Sleeves are not required for wall hydrants.
 - 1) Install sleeves for pipes that pass through walls. Sleeves that pass through walls shall be cut flush with surfaces. The space between sleeves and pipe or covering shall be sealed with graphite packing and synthetic rubber caulking compound.
 - 2) Install sleeves where pipes pass through waterproofing membrane. The sleeves shall be provided with an integral flashing flange or a clamping device to which a 4 pound lead flashing shield shall be clamped or soldered. The shield shall extend 12 inches from the pipe and shall be thoroughly mopped into the membrane. The space between the sleeve and pipe shall be made watertight by inserting an oakum gasket, filling the remaining space with lead, and thoroughly caulking.
 - b. Threaded pipe - Support pipes at 7 foot intervals.
 - c. Copper tubing - Support tubing at not more than 5 foot intervals. Hangers for copper tubing except where protective shields are installed shall have proper size rings to suit outside diameter of tubing and the hangers or supports shall be copper or copper plated at contact surfaces.
 - d. Underground piping - Lay pipe on a firm bed for its entire length, except where support is otherwise provided.
 - e. Vertical piping - Supports shall be at each floor. Horizontal piping - Hangers and supports shall be installed at locations not more than 3 feet from the end of each run out. A hanger shall be installed not over 1 foot from each change in direction of piping.

7. Unions: Make connections to equipment and branch mains with unions. Provide non-conducting type connections wherever jointing dissimilar metals in open systems. Brass adapters and valves are acceptable.
8. Domestic cold water lines penetrating concrete slabs shall be wrapped with vinyl flexible tube. Domestic hot or return water piping penetrating concrete slabs shall be insulated at all penetrations through slab (refer to insulation specifications).
9. Provide drain valves at main shutoff valves, low points of piping and apparatus.
10. Hydrostatically test entire domestic water system to 200 psig or 2-1/2 times normal working pressure.
11. Sealing or flashing the building envelope due to penetrations in building shall be the responsibility of the general contractor.
12. Water service to fixtures or groups of fixtures shall have 12 inch long air chambers at the same diameter as header or service pipe on both hot and cold water lines. Air chamber shall be installed close to fixture. Provide and install shock arrestors on sterilizer water supplies or supplies with quick closing valves such as flush valves, dishwashers, tempering valves, etc. Location and size of shock arrestor shall be as per manufacturer's instructions.

END OF SECTION 22 05 03

SECTION 22 07 00 – PLUMBING INSULATION

I. GENERAL

A. DESCRIPTION

1. Pipe insulation installation shall not begin until all work has been tested and found to be tight. All insulation shall be UL listed and have a flame spread of less than 25 and a developed smoke rating less than 50. All insulation shall be banded with aluminum bands, three per section. All insulation shall be continuous through walls, floors, ceilings, etc.

II. MATERIALS

A. DOMESTIC WATER PIPING

1. Cover cold water lines above ceilings, exposed and in exterior walls and all hot water lines with 1 inch thick closed cell rubber type insulation. At contractor's option, 1 inch thick fiberglass insulation with white universal jacket may be used. All flanges, valves and fittings shall be insulated with closed cell rubber type molded fittings insulation, fabricated mitered segments of pipe insulation or closed cell rubber type insulation equivalent in thickness to insulation of adjoining pipe.
2. All water lines exposed in finished spaces and mechanical rooms shall be covered with 0.020 color coded PVC jacket with solvent welded seams and joints.
3. All water lines outside of building exposed to the weather shall have 1 inch thick closed cell rubber type insulation covered with 0.016 smooth aluminum jacket and elbows.
4. All water lines below building slab shall be insulated with 1 inch thick closed cell insulation with two (2) coats of mastic.

B. HORIZONTAL WASTE PIPING

1. All horizontal waste lines and traps above slab which receive condensate from air conditioning equipment shall be insulated with 2 inch thick, 3/4 pound density fiberglass insulation with aluminum foil vapor barrier or closed cell rubber insulation. Provide PVC jacket where exposed similar to domestic water above.

C. INSULATION BANDS

1. All pipe insulation shall be banded with nylon tie-wrap bands, three (3) to a section, and with one (1) band on each side of each fitting, valve, etc.

D. FLANGES, VALVES AND FITTINGS

1. All flanges, valves and fittings shall be insulated with fabricated fiberglass molded fitting insulation, using factory fabricated fittings up to 3 inches and fabricated mitered segments of pipe insulation equal in thickness to the insulation to the adjoining pipe. All fabricated mitered segments shall be covered with matching embossed vapor barrier laminate.

III. INSTALLATION

- A. Provide clearance for installation of insulation and for access to valves, air vents, drains and unions.

1. Insulation Installation:

- a. Do not install covering before piping has been tested and approved.
- b. Ensure piping surface is clean and dry prior to installation.
- c. Ensure insulation is dry before and during application.
- d. Insulation shall be continuous through walls, floors and ceiling. Pack around pipes with fire proof self-supporting insulation material, fully sealed.
- e. Insulate fittings and valves. The end of the insulation shall be fitted with a metal escutcheon plate with set screw or taped neatly with pressure sensitive fiberglass reinforcing cloth.
- f. All joints shall be sealed with 3 inch wide fiberglass reinforcing cloth with pressure sensitive adhesive.
- g. Pipe insulation at Hangers and Supports: Pipe insulation at hanger and support shall be protected with a half circular shield of the size of the insulation and 12 inches long constructed from 20 gauge galvanized steel. The shield shall be held in place with the fiberglass reinforcing cloth and pressure sensitive adhesive. Where pipes pass through walls, ceiling and floor in finished areas, escutcheon plates shall be installed to encompass pipe and insulation. Escutcheon plates shall be chromed brass or stainless steel and shall be either solid or the clamp on split type.
- h. Painting of fiberglass pipe jacket is not required. Piping shall be painted colors as standard in this facility.
- i. The first 8 feet of outlet piping and the inlet piping between the storage tank (water heater) and a heat trap (including the heat trap)

must be insulated with fiberglass insulation equivalent in thickness to supply water piping.

END OF SECTION 22 07 00

SECTION 22 10 00 - PLUMBING

I. GENERAL

A. DESCRIPTION

1. Furnish all labor and materials as hereinbefore specified, indicated or reasonably implied for the complete installation of the following systems:
 - a. Cold Water
 - b. Hot Water System
 - c. Sanitary Drainage System

II. MATERIALS

A. FLOOR DRAINS

1. All floor drains shall be constructed of cast iron and shall be complete with clamping devices as required.
2. Floor drains (Marked "FD"): shall be bottom outlet with duracoated cast iron body with clamping collar and 6 inch diameter nickel bronze strainer adjustable vertically to floor level, with square perforations and vandal proof screws. Refer to fixture schedule for specific types.

B. CLEANOUTS

1. Cleanouts shall be provided where shown on plans, at each change of direction of the building drain greater than 45 degrees and at or near the foot of each vertical waste or soil stack. Location of all cleanouts shall be same size as piping up to 4 inches. Larger pipes shall have 4 inch cleanouts unless noted otherwise. Every cleanout shall be installed so that the cleanout opens in the direction of flow of the drainage line or at right angles thereto. Floor cleanouts shall be adjustable type, double drainage flange, clamping collar (above grade installations), 2 pound lead flashing, nickel bronze cover. Top of cleanout shall be level with top of finished floor so there is a continuous surface. Cleanouts shall be Jay R. Smith, Josam, Zurn or Wade. Wall cleanouts shall be nickel bronze access frame and cover. Outside cleanouts shall be installed with cover, set flush with finished grade, or as detailed on plans.

C. FLASHING

1. Flash around all pipes passing through roof in connection with this contract with sheet lead, not less than 2-1/2 pound to the square foot, built 6 inches into the waterproofing, running 10 inches up the pipe and turned over into the pipe cavity. Flashing around roof drains shall be not less than 2-1/2 pound lead extending at least 12 inches from the drain rim into membrane waterproofing. Fasten flashing to drain clamp device making watertight durable joint.

D. EQUIPMENT FURNISHED BY OWNER AND/OR BY OTHER TRADES

1. This equipment and other miscellaneous equipment shall be furnished and set in place under other sections of these Specifications and/or by the Owner, unless specified otherwise.
2. Plumbing Contractor shall provide necessary rough-in required for the equipment and shall completely connect all plumbing services for this equipment providing cut-off valves and unions for each plumbing supply service to each piece of equipment. It is the obligation of the Plumbing Contractor to obtain correct rough-in dimension plans for this equipment as well as the equipment furnished under this contractor.
3. The various equipment contractors shall provide access holes for service lines that enter his equipment. This work to be performed on the job site, as necessary. Plumbing Contractor shall furnish and install escutcheons, locknut type, at these locations.

E. PLUMBING FIXTURES

1. Plumbing Contractor shall furnish and install all plumbing fixtures shown on accompanying drawings. Refer to both plumbing and architectural drawings and provide all fixtures shown on either. Fixtures shall be complete with all necessary brass and accessories required for a complete installation including traps, escutcheons, angle supplies, basin cocks, etc. All fixtures shall be new and must be delivered to the building properly crated in perfect condition.
2. All brass must be of the best quality; lightweight goods will not be accepted. All brass pipe shall be seamless brass tubing and nipples shall be extra heavy. All fittings and trim shall be chromium plated heavy brass unless otherwise specified. "P" traps shall be cast brass with cleanouts. All exposed piping shall be chromium plated. Provide cutoff valves at each fixture in both hot and cold water piping.

3. For the purpose of establishing type and class of fixtures required, the scheduled plate numbers have been taken from the indicated catalog. Approved equals shall be as follows: Fixtures: Kohler, Zurn, Briggs, American Standard, Crane, Eljer, Elkay, Dayton, Just or Universal Rundle. Flush Valves: Sloan, Zurn. Faucets: Elkay, Just, Chicago, Kohler, American Standard, Delta Commercial, Zurn, Speakman. Water Heaters: A.O.Smith, Ruud/Rheem, State, Bradford White. Drains: Wade, J.R. Smith, Zurn, Josam. Hose Bibbs: Josam, Woodford, J.R. Smith, Wade, Zurn.

III. EXECUTION

A. SURFACE CONDITIONS

1. Inspection:
 - a. Prior to all work of this section, carefully inspect the installed work of adjacent trades and verify that all such work is complete to the point where fixture installation may properly commence.
 - b. Verify that all hangers and fixture supports are properly installed to receive plumbing fixtures.

B. PLUMBING FIXTURE

1. Each plumbing fixture shall be fitted with all necessary and proper fittings, trimmings and operating devices, and shall be in perfect operating condition.
2. Refer to architectural drawings for any other information that may be necessary or required in connection with plumbing installation.
3. Before setting any fixtures, obtain the exact mounting height, as desired, from the Architect.
4. Wall mounted water closets, urinals, and lavatories shall have a floor anchored carrier to fit in available wall space (coordinate requirements in drawings).

END OF SECTION 22 10 00

SECTION 22 11 00 - WATER SUPPLY

I. GENERAL

A. DESCRIPTION

1. Install water supply piping as indicated on plans.

II. MATERIALS

A. PIPING

1. All water supply piping shall be of materials hereinbefore specified.
2. All water lines shall be disinfected in accordance with the State Sanitary Code.

III. EXECUTION

A. INSTALLATION

1. Water lines run underground shall have a minimum of 24 inches cover to finished grade.
2. Make up complete water supply system. Connect to all fixtures and outlets requiring water.
3. At each fixture or group of fixtures furnish and install a 12 inch high air chamber of same size as branch feed line except at fixtures with quick closing valves such as flush valves, dishwashers, etc., in which cases provide "Shock Arrester" properly sized for each unit.

B. TESTING

1. All lines shall be tested in accordance with requirements listed in construction documents and State Plumbing Code.

END OF SECTION 22 11 00

SECTION 22 13 00 - WASTE WATER DISPOSAL

I. GENERAL

A. DESCRIPTION

1. Extend sanitary sewer lines to the location as shown on the plans.

II. MATERIALS

A. PIPING

1. The system of sewage and drainage shall be of materials as hereinbefore specified except where space requirements necessitate the use of Type "DWV" copper.

III. EXECUTION

A. INSTALLATION

1. All work shall be in strict conformity with the State Plumbing Code and in accordance with all local codes. Piping shall be routed as shown on plans or in acceptable manner to meet building conditions. Venting shall be as shown on plumbing riser diagrams.
2. Connections between traps and cast iron pipes are to be made with heavy brass ferrules.
3. Provide reducers, increasers, special flanges, and fittings where required between piping work and fixtures in order to connect and complete work and render it ready for use. Make any offsets required to avoid construction.
4. All lines 3 inches and smaller shall be sloped 1/4 inch per foot, lines 4 inches through 6 inches shall be sloped 1/8 inch per foot, lines 8 inches and larger shall be sloped 1/16 inch per foot. Piping shall be laid so slope is continuous.
5. All vents shall extend 10 inches above roof and terminate in an appropriate flashing collar. No vents shall penetrate roof within 48 inches of an exterior wall. Offset in ceiling as required. All back vents shall be taken off as near trap as possible.

B. TESTING

1. All lines shall be tested in accordance with requirements listed in construction documents and State Plumbing Code.

END OF SECTION 22 13 00

SECTION 22 16 00 – NATURAL GAS PIPING/DISTRIBUTION

I. GENERAL

A. DESCRIPTION

1. Fuel gas systems, including piping, equipment and all necessary accessories as designated in this section. Fuel gas piping to equipment shall be routed as shown on plans.

B. RELATED WORK

1. FIRESTOPPING: Penetrations in rated enclosures.
2. PAINTING: Preparation and finish painting and identification of piping systems.
3. COMMON WORK RESULTS FOR PLUMBING.
4. GENERAL DUTY VALVES FOR PLUMBING PIPING

C. SUBMITTALS

1. Submit SHOP DRAWINGS, PRODUCT DATA, and SAMPLES.
2. Manufacturer's Literature and Data:
 - a. Pipe & Fittings.
 - b. Valves.
 - c. Strainers.
 - d. All items listed in Part 2 - Products.
3. Detailed shop drawing of clamping device and extensions when required in connection with the waterproofing membrane.

D. APPLICABLE PUBLICATIONS

1. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only. Use the edition listed or most recent edition adopted by Local, State or Federal agencies having jurisdiction.

2. Federal Specifications (Fed. Spec.):
A-A-59617 Unions, Brass or Bronze Threaded, Pipe Connections and Solder-Joint Tube Connections

3. American National Standards Institute (ANSI):
American Society of Mechanical Engineers (ASME): (Copyrighted Society)
A13.1-(2007) Scheme for Identification of Piping Systems
B16.3-(2006).....Malleable Iron Threaded Fittings: Classes 150 and 300 ANSI/ASME
B16.9-2007.....Factory-Made Wrought Steel Buttwelding Fittings ANSI/ASME
B16.11-2009.....Forged Steel Fittings, Socket-Welding and Threaded ANSI/ASME
B16.15-2006.....Cast Copper Alloy Threaded Fittings: Classes 125 and 250 ANSI/ASME
B31.8-2010 Gas Transmission and Distribution Piping Systems ANSI/ASME

4. American Society for Testing and Materials (ASTM):
A47-99(2009) Standard Specification for Ferritic Malleable Iron Castings
A53-10 Standard Specification for Pipe, Steel, Black And Hot-Dipped, Zinc-coated Welded and Seamless
A183-09 Standard Specification for Carbon Steel Track Bolts and Nuts
A536-09 Standard Specification for Ductile Iron Castings
A733-03(2009)e1 Standard Specification for Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples
B687-99(2005)e1 Standard Specification for Brass, Copper, and Chromium-Plated Pipe Nipples

5. National Fire Protection Association (NFPA):
54-2009 National Fuel Gas Code

6. International Code Council
IPC 2009 International Plumbing Code
IFGC 2009 International Fuel Gas Code

7. International Association of Plumbing and Mechanical Officials (IAPMO): Uniform Plumbing Code – 2009
IS6-06.....Installation Standard

8. Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS):
 - SP-72-2010 Ball Valves with Flanged or Butt-Welding For General Service
 - SP-110-2010 Ball Valve Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends

E. SYSTEM PRESSURE

1. Natural gas systems, unless otherwise noted are designed and materials and equipment selected to prevent failure under gas pressure at downstream side of pressure regulator.

II. MATERIALS

A. FUEL GAS SERVICE CONNECTIONS TO BUILDING (UNDERGROUND AND/OR EXPOSED TO WEATHER)

1. From inside face of exterior wall (outside of building), use coated piping as herein before and/or herein after specified.
2. Pipe: Black Steel, ASTM A53, Schedule 40. Shop-applied pipe coating shall be one of the following types:
 - a. Coal Tar Enamel Coating: Exterior of pipe and fittings shall be cleaned, primed with Type B primer and coated with hot-applied coal tar enamel with bonded layer of felt wrap in accordance with AWWA C203. **Asbestos felt shall not be used**; felt material shall be fibrous glass mat as specified in Appendix Section A2.1 of AWWA C203.
 - b. Adhesive-thermoplastic Resin Coating: Fed. Spec. L-C-530, Type I
 - c. Thermosetting Epoxy Coating: Fed. Spec. L-C-530, Type II
 - d. Field-applied plastic tape material used on pipe joints and for repairing damaged areas of shop-applied coatings, Fed. Spec. L-T-1512, Type I, 10 mils nominal thickness for pipe joints, and Type II, 20 mils nominal thickness for coating repairs.
3. Holiday Inspections: Procedure for holiday inspection: Holiday Inspection shall be conducted on all coatings to determine the presence and number of discontinuities in those coatings referenced in 2.6/B - 1, 2, 3, and 4 using a Tinker & Razor model AP/W Holiday Detector. Holiday inspection shall be performed in a manner spelled out in the Tinker & Razor operating instructions and at a voltage level recommended by the coating manufacturer or applicable NACE International Standard such as

RPO 274-93 or RPO 490-90 in the case thermosetting epoxy coating. Holiday Detectors shall be calibrated and supplied with a certificate of calibration from the factory. A calibration of the Holiday Detector shall be performed once every 6 months to verify output voltages are true and correct.

4. Fittings:
 - a. Butt weld fittings, wrought steel, ANSI B16.9.
 - b. Socket weld and threaded fittings forged steel, ANSI B16.11.
 - c. Grooved End: Ductile iron (ASTM A536, Grade 65-45-12), malleable iron (ASTM A47, Grade 32510), or steel (ASTM A53, Type F or Type E or S, Grade B).
5. Joints: Welded, ANSI B31.8.

B. FUEL GAS PIPING

1. Pipe: Black steel, ASTM A53, Schedule 40.
2. Nipples: Steel, ASTM A733, Schedule 40.
3. Fittings:
 - a. Sizes 2 inches under ANSI B 16.3 threaded malleable iron.
 - b. Over 2 inches and up to 4 inches ANSI B16.11 socket welded.
 - c. Over 4 inches ANSI 16.9 butt welded.
4. Joints: Provide welded or threaded joints.

C. EXPOSED FUEL GAS PIPING

1. Finished Room: Use full iron pipe size chrome plated brass piping for exposed fuel gas piping connecting fixtures, casework, cabinets, equipment and reagent racks when not concealed by apron including those furnished by the Government or specified in other sections.
 - a. Pipe: Fed. Spec. WW-P-351, standard weight
 - b. Fittings: ANSI B16.15 cast bronze threaded fittings with chrome finish, (125 and 250).
 - c. Nipples: ASTM B 687, Chromium-plated.
 - d. Unions: 2 inches and smaller Mss SP-72, SP-110, Brass or Bronze threaded with chrome finish. Unions 2-1/2 inches and larger shall be flange type with approved gaskets.

e. Valves: Mss SP-72, SP-110, Brass or bronze with chrome finish.

2. Unfinished Rooms, Mechanical Rooms and Kitchens: Chrome-plated brass piping is not required. Paint piping systems as specified in Section PAINTING

D. VALVES

1. Ball Valve: Bronze body, rated for 1025 kPa at 185°C (150 psi at 365°F), 1725 kPa at 121°C (250 psi at 250°F), reinforced TFE seat, stem seal and thrust washer; end entry, threaded ends, UL-listed for natural or LP gas shut off service when used on those services.
2. Gas Vent Cocks: Type 701: Bronze body, tee handle, rated for 205 kPa at 38°C (30 psi at 100°F), ground plug, rated for tight shut-off on fuel gas service.

E. WATERPROOFING

1. Provide at points where pipes pass through membrane waterproofed floors or walls in contact with earth.
2. Floors: Provide cast iron stack sleeve with flashing device and an underdeck clamp. After stack is passed through sleeve, provide a waterproofed caulked joint at top hub.
3. Walls: See detail shown on drawings.

F. STRAINERS

1. Provide on high pressure side of pressure reducing valves, on inlet side of indicating and control instruments and equipment subject to sediment damage and where shown on drawings. Strainer element shall be removable without disconnection of piping.
2. Gas Lines: "Y" type with removable mesh lined brass strainer sleeve.
3. Body: Smaller than 3 inches, brass or bronze; 3 inches and larger, cast iron or semi-steel.

G. DIELECTRIC FITTINGS

1. Provide dielectric couplings or unions between ferrous and non-ferrous pipe.

H. GAS EQUIPMENT CONNECTORS

1. Flexible connectors with teflon core, interlocked galvanized steel protective casing, AGA certified design.

I. REGULATORS

1. Provide all pressure regulators for the project. Contractor shall be responsible for providing regulators properly selected for pressure, flow, and location. All regulators shall be field adjustable. All regulators shall be vented type. Regulators installed inside buildings shall have vent piping extended to the exterior of the building.

III. EXECUTION

A. INSTALLATION

1. General: Comply with the International Fuel Gas Code and the following:
 - a. Install branch piping for fuel gas and connect to all fixtures, valves, cocks, outlets, casework, cabinets and equipment, including those furnished by the Government or specified in other sections.
 - b. Pipe shall be round and straight. Cutting shall be done with proper tools. Pipe, shall be reamed to full size after cutting.
 - c. All pipe runs shall be laid out to avoid interference with other work.
 - d. Install valves with stem in horizontal position whenever possible. All valves shall be easily accessible.
 - e. Install union and shut-off valve on pressure piping at connections to equipment.
 - f. Pipe Hangers, Supports and Accessories:
 - 1) All piping shall be supported per the International Fuel Gas Code, Chapter No. 4.
 - 2) Shop Painting and Plating: Hangers, supports, rods, inserts and accessories used for Pipe supports shall be shop coated with zinc Chromate primer paint. Electroplated copper hanger rods, hangers and accessories may be used with copper tubing.
 - 3) Floor, Wall and Ceiling Plates, Supports, Hangers:
 - a) Solid or split unplated cast iron, chrome plated in finished areas.
 - b) All plates shall be provided with set screws.
 - c) Pipe Hangers: Height adjustable clevis type.
 - d) Adjustable Floor Rests and Base Flanges: Steel.

- e) Concrete Inserts: "Universal" or continuous slotted type.
 - f) Hanger Rods: Mild, low carbon steel, fully threaded or Threaded at each end with two (2) removable nuts at each end for positioning rod and hanger and locking each in place.
 - g) Riser Clamps: Malleable iron or steel.
 - h) Rollers: Cast iron.
 - i) Self-drilling type expansion shields shall be "Phillips" type, with case hardened steel expander plugs.
 - j) Miscellaneous Materials: As specified, required, directed or as noted on the drawings for proper installation of hangers, supports and accessories.
- g. Install cast chrome plated escutcheon with set screw at each wall, floor and ceiling penetration in exposed finished locations and within cabinets and millwork.
- h. Penetrations:
- 1) Fire Stopping: Where pipes pass through fire partitions, fire walls, smoke partitions, or floors, install a fire stop that provides an effective barrier against the spread of fire, smoke and gases. Completely fill and seal clearances between piping and openings with the fire stopping materials.
 - 2) Waterproofing: At floor penetrations, completely seal clearances around the pipe and make watertight with appropriate sealant.

2. Piping shall conform to the following:

- a. Fuel Gas:
- 1) Entire fuel gas piping installation shall be in accordance with requirements of NFPA 54.
 - 2) Provide fuel gas piping with plugged drip pockets at low points.

B. CLEANING OF SYSTEM AFTER INSTALLATION

1. Clean all piping systems to remove all dirt, coatings and debris.

C. TESTING

1. General: Test system either in its entirety or in sections after system is installed and cleaned.

2. Test shall be made in accordance with Section 406 of the International Fuel Gas Code. The system shall be tested at a minimum of 1.5 times maximum working pressure, but not less than 30 psig (20 kPa) gage).

END OF SECTION 22 16 00

SECTION 23 05 00 - GENERAL PROVISIONS FOR HVAC

I. GENERAL

A. DIVISION OF SPECIFICATIONS

1. For Bidder's convenience only, this Division of the Specifications is divided into the following parts:

23 05 00	GENERAL PROVISIONS FOR HVAC
23 05 03	BASIC MATERIALS AND METHODS FOR HVAC
23 05 93	TESTING, ADJUSTING, AND BALANCING
23 07 00	MECHANICAL INSULATION
23 09 00	TEMPERATURE CONTROLS
23 30 00	AIR DISTRIBUTION
23 70 00	AIR CONDITIONING

B. GENERAL CONDITIONS

1. The General Conditions of the Architectural Specifications along with supplementary conditions, special conditions, information to bidders, and any other pertinent information and documents shall apply the same as if repeated herein. The contractor shall review Architectural General Conditions. Where the requirements of Architectural General Conditions and these specs conflict for the contractor, the most stringent shall be applied.
2. Mechanical (HVAC) subcontractor shall be the sole source responsible party to furnish and install the mechanical system. Mechanical contractor shall be properly licensed to perform this work.
3. Wherever the word contractor is mentioned in Division 23 of these specifications, it is intended to mean the Mechanical Contractor as appropriate. These are sub contractors to the General Contractor who has the contract with the owner. It is the General Contractor who bears the responsibility to fulfill this part of the project (Division 23 – Mechanical) under the contract with the owner. The General Contractor shall be responsible for all costs associated with any and all bidding errors and omissions of the sub-contractor.

C. SCOPE OF WORK

1. Furnish labor, materials and equipment necessary to provide and install the complete mechanical portion of this contract, including air conditioning, heating, and ventilating systems as called for herein and on accompanying drawings. Parts of the mechanical division may be bid separately or in combination at the contractor's option; however, it shall be the responsibility of the General Contractor to assure himself that all items covered in the Mechanical Division have been included if he chooses to accept separate bids.
2. Contractor shall refer to the Architectural, Structural, Plumbing and Electrical drawings and install all equipment, piping, etc., to meet building and space requirements. **No equipment shall be bid on or submitted for approval if it will not fit in space provided or coordinated with other trades involved on the project.**
3. It is the intention of these Specifications that all mechanical systems shall be furnished complete with all necessary valves, controls, insulation, piping, devices, equipment, etc., necessary to provide a satisfactory installation in working order and in accordance with all Federal, State and Local codes and ordinances.
4. Contractor shall visit the site and acquaint himself thoroughly with all existing facilities and conditions which would affect his portion of the work. Failure to do so shall not relieve the contractor from the responsibility of installing his work to meet conditions.
5. Lack of coordination shall not be acceptable and shall not be a reason for poorly installed work or additional cost to this trade or others on the project. All associated extra cost shall be borne by the contractor. The General Contractor shall be responsible for all costs, time and liquidated damages associated with lack of coordination or poor coordination.

D. **LOCAL CONDITIONS**

1. Location and elevation of all services is based on information obtained from the Owner. However, this shall serve as a general guide only and the contractor shall visit the site and verify the location and elevation of this service to his own satisfaction in order to determine the amount of work required for the execution of the contract.
2. Contractor shall contact the various utility companies, determine the extent of their requirements and cooperate with the utility company in reaching a finished product. Contractor shall pay charges by Utility Company for extensions, connections meter fees, street patching, etc.

3. In case major changes are required, this fact, together with the reasons therefore, shall be submitted to the Architect, in writing, not less than seven days before the date of bidding. Failure to comply with this requirement will make the contractor liable for any changes, additions and expenses necessary for the successful completion of the project.

E. CUTTING AND PATCHING

1. Initial cutting and patching shall be the responsibility of the General Contractor with the Mechanical Contractor responsible for laying out and marking any and all holes required for the reception of his work. No structural beams or joists shall be cut or thimble without first receiving the approval of the Architect/Engineer. After initial surfacing has been done, any further cutting, patching and painting shall be done at this contractor's expense.
2. Cutting and patching shall be done in such a manner that the surrounding work will be restored to its original condition.
3. The HVAC piping shall be run in such a manner as to avoid conflicts with other trades. It may be necessary to penetrate beams, grade beams, footings, and foundations. Install thimbles as required and as approved by the Structural Engineer and Architect.

F. CODES AND STANDARDS

1. The entire mechanical work shall comply with the rules and regulations of the City, Parish and State in which this project is being constructed including the State Fire Marshal and State Board of Health. All modifications required by these authorities shall be made without additional charge to the Owners. The Mechanical Contractor shall report these changes to the Architect and secure his approval before work is started.
2. In addition to the codes mentioned, all mechanical work and equipment shall conform to the applicable portions of the following Specifications, codes and regulations:
 - a. American Society of Heating, Refrigeration and Air Conditioning Engineers
 - b. National Electric Code
 - c. National Fire Protection Association
 - d. American Society of Mechanical Engineers

- e. Underwriters's Laboratories
 - f. American Gas Association
 - g. Energy Code for Commercial and High Rise Residential Buildings
 - h. International Energy Conservation Code (LA)
 - i. International Building Code (LA)
 - j. International Plumbing Code with Louisiana Amendments
 - k. International Mechanical Code (LA)
 - l. International Fuel Gas Code
 - m. SMACNA Guidelines
3. Materials, equipment and accessories installed under this contract shall conform to all rules, codes, etc., as recommended by National Associations governing the manufacturer, rating and testing of such materials, equipment and accessories. Materials shall be new and of the best quality and first class in every respect. Whenever directed by the Architect, contractor shall submit a sample for approval before proceeding.
4. Where laws or local regulations provide that certain accessories such as gauges, thermometers, relief valves and parts be installed on equipment, it shall be understood that such equipment be furnished complete with the necessary accessories whether or not called for in these Specifications.
5. Material and equipment furnished or installed as part of these construction documents shall be installed and operated in strict accordance with the respective manufacturer's guidelines for installation and operating instructions. The manufacturer's guidelines shall become part of the construction documents.

G. MINOR DEVIATIONS

1. Plans and detail sketches are submitted to limit, explain and define conditions, specified requirements, pipe sizes and manner of erecting work. Structural or other conditions may require certain modifications from the manner of installation shown and such deviations are permissible and shall be made as required, but, specified sizes and requirements necessary for satisfactory operation shall remain unchanged. It may be necessary to shift ducts or pipes or to change the shape of ducts and these changes shall be made as required. All such changes shall be referred to the Architect/Engineer for approval before proceeding. Extra charges shall not be allowed for these changes.
2. No structural beams or joists (concrete or steel) shall be cut or thimble without first receiving the approval of the Architect/Structural Engineer.

After initial surfacing has been done, any further cutting, patching and painting shall be done at the Mechanical Contractor's own expense.

3. Contractor shall realize that the drawings could delve into every step, sequence or operation necessary for the completion of the project without drawing on the contractor's experience or ingenuity. However, only typical details are shown on the plans. In cases where the contractor is not certain about the method of installation of his work, he shall ask for details. Lack of details shall not be an excuse for improper installation. Submit installation shop drawings with manufacturer's details for review prior to installation.
4. In general, the drawings are diagrammatic and the contractor shall install his work in a manner so that interferences between the various trades are avoided. In cases where interferences do occur, the Architect is to state which equipment, piping, etc., is to be relocated regardless of which item was first installed.
5. Materials and equipment furnished or installed as part of these construction documents shall be installed and operated in strict accordance with the respective manufacturer's guidelines for installation and operating instructions. The manufacturer's guidelines shall become part of the construction documents.

H. WORKMANSHIP

1. Workmanship shall be of highest grade, highest quality and all construction shall be done according to the best practice of the trade. Work shall be completed to satisfaction of the Architect/Engineer.

I. COORDINATION

1. Coordinate work of the different trades to avoid interferences between mechanical and all other work. All piping, ductwork, etc., shall be installed in lines as required to accomplish this end whether or not shown on the plans.
2. There will be a certain amount of work which must be coordinated with the Owner. This contractor shall coordinate required work with the Owner through the General Contractor using procedures acceptable to the Architect and Owner. The contractor shall maintain documentation of coordinated work.

3. This contractor shall coordinate and confirm that all equipment requiring electric service will be adequately and properly serviced by Electrical Contractor. Any conflicts shall be brought to the attention of the Architect/Engineer prior to ordering the equipment. **VERIFY ALL VOLTAGES WITH THE ELECTRICAL PLANS AND ELECTRICAL CONTRACTOR.**
4. This contractor shall coordinate the space clearances required for the HVAC ductwork with the structure, ceilings, lights, sprinklers, etc. In some cases, due to space limitations, it may be necessary to re-size ductwork to meet the conditions of the project. **Any resizing required shall be part of this project and done without any additional cost to the Owner. DO NOT MAKE DUCTWORK WITHOUT COORDINATION. Avoid conflicts with other trades.**
5. This contractor shall coordinate the installation of HVAC piping with all parts of the structural foundation system and structural building systems. Provide sleeves through grade beams or concrete beams at all conflicts. All points of penetration of foundation shall be reviewed by the Architect/Engineer prior to rough-in. All sleeves shall be installed per instructions and details of the structural engineer.
6. All piping shall be run as high as possible with sleeves through concrete beams to avoid conflicts. This means the piping shall run in or through the structure unless approved otherwise by the Architect/Engineer.

J. **REVIEW OF MATERIALS**

1. Whenever manufacturers or trade names are mentioned in these plans or Specifications, the words "or approved equivalent" shall be assumed to follow whether or not so stated. Manufacturers or trade names are used to establish a standard of quality only and should not be construed to infer a preference. Equivalent products which meet the Architect's approval will be accepted; however, these requests for acceptance of products must be received by the Architect a minimum of ten days prior to bid date. Submission shall include manufacturer's name, model number, rating table and construction features. Upon receipt and checking of this submittal, the Architect will issue an addendum listing items which are approved as equivalent to those specified. The contractor shall base his bid solely on those items specified or included in the "Prior Approval Addendum" as no other item will be acceptable. Prior approval of a particular piece of equipment does not mean automatic final acceptance and will not relieve the contractor of the responsibility of assuring himself that this equipment is in complete accord with plans and Specifications and will fit into the

space provided. Submit shop drawings on all items of equipment for approval as hereinafter specified.

2. Should a substitution or variation occur, the better quality or greater quantity of material or work shall be furnished. This also does not preclude other manufacturers if they meet the following criteria:
 - a. Product proposed for substitution shall be equal or superior to that specified in construction, efficiency, utility and function.
 - b. Physical size of substitute brand shall not be greater than space provided for it.
 - c. Profile of substitution shall be same concerning size, shape, indentations, recesses, etc.
 - d. Complete illustrations, specifications and description of substitution shall be submitted for approval.
 - e. Availability and proximity of manufacturer's service representative shall be factors considered in substitution approval.
 - f. Substitution and/or variations shall be reviewed and allowed when there is no change in cost to the project and shall be made at the discretion of the Engineer.

K. SHOP DRAWINGS

1. The General Contractor shall submit mechanical submittal within 30 days of the date of the contract between owner and contractor or the date of notice to proceed as issued by the owner to the General Contractor. The mechanical submittals shall have been submitted to the General Contractor within 30 days after the construction contract has been signed. The General Contractor and his sub-contractors shall bear all responsibility for any extra costs or delays to late submittals of shop drawings.
2. Drawings shall be presented in a clear and thorough manner.
3. Details shall be identified by reference to sheet detail, schedule or room numbers shown on contract and drawings.
4. Drawings shall contain the following information:
 - a. Date.
 - b. Number of the drawing or revision.
 - c. Name of project or facility.
 - d. Name of contractor and subcontractor.
 - e. Clear identification of contents and location of work.

5. Preparation:
 - a. Clearly mark each copy to identify pertinent products or models.
 - b. Show performance characteristics and capacities.
 - c. Show dimensions and clearances required.
 - d. Show wiring or piping diagrams and controls.
 - e. Show weights and mounting data.
 - f. Provide letter documentation confirming that all coordination with other trades effected have been done. This is especially necessary with the electrical requirements and rough-in requirements.
6. Manufacturer's standard schematic drawings and diagrams:
 - a. Modify drawings and diagrams to delete information which is not applicable to the work.
 - b. Supplement standard information to provide information specifically applicable to the work.
7. Office samples shall be of sufficient size and quantity to clearly illustrate:
 - a. Functional characteristics of the product, with integral related parts and attachment devices.
 - b. Full range of color, texture and pattern.
8. Equipment shop drawing shall be prepared by the contractor/supplier. These shop drawing shall include the manufacturer's performance data and installation manuals. In addition, the shop drawings shall show the installation specific to this project.
9. Assemble certificates, executed by each of the respective manufacturers, suppliers, and subcontractors.
10. All submittals shall be submitted prepaid and in ample time for review before installation.
11. Six (6) copies of each submittal shall be submitted to the Architect.
12. These shop drawings shall be supplied as part of this contractor's contract. Any drawings not approved shall be resubmitted until approved. **Submit all shop drawings at the same time. No separate items will be accepted.**
13. Time necessary for review of samples, certificates, test reports, and shop drawings is at least 30 calendar days after receipt of the item. All

materials installed in the work shall match the reviewed submittals. After a submission has been reviewed, no substitutions will be permitted without written approval by the Architect.

14. The Architect's/Engineer's review of shop drawings shall not relieve the contractor from the responsibility of incorrectly figured dimensions or any other errors that may be contained in these drawings. The omission from the shop drawings or specifications, even though approved by the Architect, shall not relieve the contractor from furnishing and erecting same.
15. Any delays caused by contractor not submitting shop drawings within a timely manner shall be the problem of the responsible subcontractor and the General Contractor.

L. UTILITIES

1. Connect all mechanical utilities at the points indicated on the drawings and extend such utilities to the building and to equipment or facilities requiring same.
2. Contractor shall pay all service and connection charges required by utilities companies and/or site conditions (offsets, conflict boxes, etc.).
3. Contractor shall include all costs required by utility companies to extend utilities to the site. It is the responsibility of the contractor to obtain these fees from the utility companies and include those costs in the bid.

M. REPAIRING ROADWAYS AND WALKS

1. Where this contractor cuts or breaks roadways or walks to lay the piping, he shall repair or replace these sections to meet the Architect's approval. Repair of public roadways and highways shall be done as per the Federal, State or Local agencies having jurisdiction. Contractor shall obtain and pay for all permits.

N. EXCAVATION AND BACK FILL

1. Trench and excavation work shall include excavating, preparing of trenches, and backfilling as specified. Contractor shall install caution tape 12 inches above all piping, conduit, etc., as backfilling processes.
2. Trench and excavation work shall not include pavement breaking, cutting of holes through foundation walls and floors, removal of obstructions,

relaying and/or repairing of floors, and repaving, which work shall be the responsibility of the General Contractor.

3. Contractor shall do all necessary trenching, excavation and backfilling for the proper installation of his work. Care shall be taken not to excavate below depth required, that trench beds are well rounded and that ground under pipe line is firm and secure before any pipe is laid. Trenches shall be excavated where bells of pipe occur in order to insure a pipe resting on the entire length of the bottom of the trench.
4. Unless otherwise noted, minimum cover over underground lines shall be 2-1/2 feet, except under streets and parking lots where minimum cover shall be 3 feet.
5. The width of the trench shall be sufficient to permit thorough compaction of the backfill under and around the pipe but not exceeding the external diameter of the pipe by more than 12 inches. Excavation for pipes shall be by hand and/or machine and as specified herein and shall conform to the lines and elevations indicated on the plans.
6. The pipe shall be placed on a uniformly firm and compacted bed of sand, carefully shaped to support the pipe at the desired grade and so that any reaction will be distributed as nearly uniform as possible over a horizontal width of not less than six-tenths (6/10) of the outside diameter and all possibility of concentration of the reaction at or near the vertical diameter eliminated. The bed shall be shaped as to fit the lower part of the pipe exterior for at least 10 percent of its overall height.
7. The pipe shall be placed on a firm foundation. Any muck or other objectionable material found during excavation and preparation of the bed shall be removed and replaced with suitable bed material directed by the Architect.
8. All trenches and excavation shall be backfilled in a reasonable time after the pipes are installed unless otherwise directed by the Architect. Special care shall be taken in placing the backfill and extra care shall be used to obtain compaction under and along sides to the top of the pipe.
9. The backfill shall be placed in loose layers not exceeding 6 inches in depth under and around the pipe and not exceeding 8 inches over the pipe. Each layer shall be compacted to the compaction requirements as specified by the Architect.

10. Compaction shall be by hand and pneumatic tampers and the successive layers shall be added and compacted until the trench is completely filled and brought to elevation as directed. Back-filling shall be done in such a manner as to avoid injurious top or side pressures on the pipe.
11. Improper backfilling and compacting shall be cause to have the trench opened to expose the pipe for inspection then properly backfilled and compacted with fill material.
12. Where trenching is for piping, the bottom of the trench shall have minimum 95 percent compaction and shall be bedded with minimum 12 inches compacted sand, crushed stone or shell on undisturbed soil (minimum 95 percent compaction).

O. MATERIALS

1. Work materials shall be new and the best of their respective kinds, and shall bear the label of NFPA, ASME Code, AGA, and UL where such standard has been established for the particular item of equipment used.
2. Where project is defined as “Buy American”, the contractor shall follow laws and policies governed by this definition as indicated in architectural specifications. Submit documentation that product complies. Include in equipment submittals.

P. MATERIAL STORAGE

1. General: Provide space for storage of material and equipment at ground level. Roof surfaces shall not be used for storage of materials or equipment. Any storage within the building shall be approved by the Architect/Engineer prior to use of the space.
2. Exterior: Pipe, fitting, or other materials stored outside of building shall be set on wood or steel racks or platforms inside storage container units. All necessary provisions shall be made to keep water and debris away from such stored material. Ends of pipes and valves shall be kept sealed until used.
3. Warehousing: Equipment subject to rusting shall be kept warehoused until just prior to setting. If necessary the warehouse shall have climate controlled conditions.
4. Offsite warehousing shall be approved by the Architect and Owner only.

5. Any warehousing used shall be approved by the Owner and an insurance certificate naming the Owner as insured shall be provided to the Owner.

Q. GROUND AND CHASES

1. Contractor shall see that all required chases, sleeves, grounds, holes and accessories necessary for the installation of his work are properly built in as the work progresses; otherwise he shall bear the cost of providing them.

R. MACHINERY GUARDS

1. Contractor shall provide v-belt guards for each v-belt drive or other hazardous drive. Guard shall enclose the drive entirely and shall have a hole for taking tachometer reading.

S. SPECIAL TOOLS

1. Special tools required for proper operation or maintenance of any mechanical equipment provided under this contract shall be delivered to the Owner at the completion of the project.

T. FILL AND CHARGES FOR EQUIPMENT

1. Fill and charge with materials or chemicals all devices or equipment as required to comply with the manufacturer's guarantee or as required for proper operation of the equipment.
2. This contractor shall flush systems as required per local and state jurisdictions and equipment/material manufacturer's guidelines (chlorination, chemical treatment, etc.).

U. EQUIPMENT ACCESS

1. Large equipment to be installed in building, which is too large to permit access through doorways, shall be brought to the job by the contractor and placed before enclosing structure. Equipment shall be cribbed up from the floor by the contractor and covered where necessary or directed.

V. EQUIPMENT IDENTIFICATION

1. Stenciling: All items of major mechanical equipment (pumps, AHUs, starters, valves, etc.) shall be neatly and clearly stenciled in letters not less than 1 inch high, with the same designation as appears on drawing. Location and color of such stenciling shall be appropriate for ready

identification and/or as directed by the Architect. One set of compatible metal interlocking stencil letters and numbers shall be turned over to the Owner at the completion of the job. At contractor's option engraved plastic adhesive tags may be used. Tags used outdoors shall be listed for such use.

2. Pipe Coding: All piping, etc., both insulated and bare, shall be color coded with a general purpose pipe marker for interior locations and a 6 inch enamel painted ban for exterior locations, and stenciled as to service and characteristics on the 10 foot centers and/or as directed. Directional arrows not less than 1/2 inch wide and not less than 6 inches long shall be permanently stenciled on each line at each stencil location. Stenciling shall be located such that it is clearly visible from floor or adjacent service platform. Coding shall be as per schedule approved by Owner through submittal to Architect. At contractor's option, pre-manufactured vinyl pipe labels and directional arrows may be used but shall be banded on either end to secure to pipe.
3. Valve tags shall be installed on all valves controlling building zones, areas, or equipment. Valve tags shall be 2 inch diameter brass stenciled with valve number. A framed list of valves with associated numbers, sizes and locations shall be mounted in the building as directed by Architect.

W. TEMPORARY USE OF EQUIPMENT

1. The permanent equipment installation shall not be used for temporary purposes by the contractor for temporary conditioning of the building during construction. **Contractor shall provide temporary dehumidification and drying equipment as required to maintain clean, dry air during construction.**
2. Acceptable Use Without Specific Authorization: Temporary use shall not be construed to mean "bumping" of electric motors on equipment to verify rotation direction nor short time operation of systems for test purposes, operation of refrigeration and heating system for short periods to adjust controls and temperature regulation, or the operation of fans for air balance.

X. CLEANING AND ADJUSTING

1. Upon completion of his work, the contractor shall clean and adjust all equipment, controls, valves, etc. Clean all piping, ductwork, etc., and leave entire installation in good working order.

Y. PAINING

1. This contractor shall obtain the services of a painting sub-contractor as part of contract with the General Contractor for all painting.
2. General: Except for standard factory finishes, all pipe, pipe covering, ducts, equipment, supports, hangers, etc., exposed inside and outside building or in equipment room shall be painted. This contractor shall prepare surface of material to receive first coat of paint. All subsequent coatings shall be prepared by Painting Subcontractor. Requirements covering paints, workmanship and preparation of surfaces as stated in Architectural Specifications shall govern. Color coding shall be approved by Architect (submit color sample). All submittals for review shall be through Architect.
3. Damage: Where standard equipment factory finishes have been damaged or scratched, the damaged area shall be repaired or replaced by the contractor to match the original finish.
4. Preparation: Thoroughly clean surfaces of all rust, scale, cement, and dirt from all equipment, piping or other work installed and leave ready for finish painting.
5. All exposed piping shall be painted. Paint with two (2) coats of paint. The color shall be industry standard color coding. Submit color code chart with sample color chips to Architect for review prior to starting work

Z. FIRESTOPPING

1. Penetrations through rated construction shall be sealed with a material capable of preventing the passage of flames and hot gases when tested in accordance with ASTM-EB14.
2. Notify Architect for inspection of all completed fire and/or smoke barrier walls before any construction is installed that may conceal the firestopping material installation.
3. Access to random selected areas may be required by the architect at the time of final inspection should notification not be given.
4. Provide detailed instructive cutsheets of fire penetration sealing system (firestopping) used to the architect at the time of inspection. Random selective sampling by the contractor will be observed by the architect and State Fire Marshal.

AA. NOISE VIBRATION

1. General: Take the utmost precautions in the installation of the equipment, piping, and duct systems to prevent noise and vibration transmission.
2. Isolation of equipment: Equipment that would tend to cause noise or vibration shall be isolated to prevent noise transmission to the building or to other equipment.
3. Equipment Connections: Piping, conduit, or other connections to equipment shall be isolated. The contractor shall be responsible for the prevention of noise and vibration transmission through these connections to equipment.

BB. PERMITS, INSPECTIONS AND TESTS

1. Contractor shall obtain and pay for permits, fees, etc., for the installation, inspection, service connections, verifying location or construction of the work which are required by any authority and/or agencies having jurisdiction.
2. Contractor shall arrange and pay for inspections, examinations and tests required to obtain complete and final acceptance of all mechanical systems. Contractor shall deliver certificates of all such inspections to the Architect.
3. Contractor shall notify Architect and local governing authorities before any tests are made and tests are not to be drawn off a line covered or insulated until examined and approved by the authorities. In the event defects are found, these shall be corrected and the work shall be retested.
4. Prior to requesting final inspection by the Architect, the contractor shall have a complete coordination and adjustment meeting of all of his subcontractors directly responsible for the operation of any portion of the system. At the time of this meeting, each and every sequence of operation shall be checked to assure proper operation. Notify the Architect in writing ten days prior to this meeting instructing him of the time, date and whom you are requesting be present. This project shall not be accepted until the above provisions are met to the satisfaction of the Architect.

CC. TRAINING OF MAINTENANCE PERSONNEL

1. Contractor shall provide on the job training for Owner's personnel upon completion of the work including testing and adjustment. Minimum 16 hours of onsite training shall include maintenance checks, lubrication of components, adjustment of control set points, and troubleshooting techniques of the air conditioning unit.
2. Contractor shall use factory start-up personnel to train the owner's maintenance personnel (where factory start-up is specified).

DD. OPERATION AND MAINTENANCE INSTRUCTIONS

1. Provide Owner with four (4) copies of printed instructions indicating various pieces of equipment by name and model number complete with parts lists and maintenance and repair instructions. This information shall be bound in plastic covered notebooks. Submit the manuals to the Architect for approval.
2. Include all warranty certificates or statements in a separate section of the manuals. Provide all materials and test certificates for the final inspection.
3. Provide three (3) sets of DVDs of the operation and maintenance manuals.

EE. GUARANTEE

1. Contractor shall guarantee all materials, equipment and workmanship for a period of one year from the date of final acceptance of the project. This guarantee shall include furnishing of all labor and material necessary to make any repairs, adjustments or replacement of any equipment, parts, etc., necessary to restore the project to first class condition. This guarantee shall exclude only the changing or cleaning of filters.
2. If the contractor's office is in excess of a 50 mile radius of the project, he shall appoint a local qualified contractor to perform any emergency repairs or adjustments required during the guarantee period. The contractor appointed to provide emergency services shall be submitted to the Architect for his approval.

FF. WARRANTIES

1. Assemble warranties executed by each of the respective manufacturers, suppliers, and subcontractors into a warranty book and prepare a table of contents.
2. Two (2) original signed copies of each warranty are required.

3. Provide complete information for each item including:
 - a. Product and work item.
 - b. Local supplying firm or manufacturer's dealer, with name of principal, address and telephone number.
 - c. Scope of warranty.
 - d. Date of beginning of warranty.
 - e. Duration of warranty.
 - f. Provide information for Owner:
 - 1) Proper procedure to evoke the warranty in case of failure.
 - 2) Instances which might affect the validity of the warranty.
 - g. Contractor, name of responsible principal, address and telephone number.
 - h. All contractors and manufacturers equipment warranties shall start at the acceptance of the project by the Owner.
 - i. Provide owner with contact information for warranties which extend beyond one year.

GG. RECORD DRAWINGS

1. Contractor shall maintain two (2) sets of drawings of the original construction documents to utilize as markup sets to record field modifications from original construction documents. Once approval has been gained from the Architect, the contractor shall record these variances on the two (2) sets in a neat and readable manner. Noted shall be sizes, locations, changes in directions, etc. with distances dimensioned from columns, walls, inverts, etc. The maintenance and cost of these documents shall be the responsibility of the contractor.

HH. DEMOLITION

1. This contractor shall do all demolition as shown on the plans. The contractor shall make the areas ready for the new construction work. All demolition debris, piping, equipment, etc., shall be removed from the site by this contractor. All demolition work shall be scheduled through the General Contractor to prevent interruption of any existing services. Do not start any demolition which would interrupt the building operation without scheduling with the Owner (schedule through the General Contractor).
2. The Owner shall retain first salvage rights to anything within the demolition area. If the Owner selected an item to be retained, then this contractor shall remove it with care and deliver the item to the Owner

designated location on site. Anything not retained by the Owner shall become the property of the contractor and be removed from the site.

II. MATERIALS CONTAINING HAZARDOUS SUBSTANCES OR COMPONENTS

1. This contractor shall not provide any material or component of equipment which contains asbestos, lead based paint or PCBs. The contractor shall provide certificates or manufacturer's statements/letters to show that the products and/or building materials do not contain asbestos, lead based paint or PCBs.
2. If any product or building material is found to contain asbestos, lead based paint or PCBs, the contractor shall bear all cost for removal, abatement, and disposal of materials in accordance with all state and federal regulations. The contractor shall install replacement materials to the satisfaction of the Architect at no additional cost to the project.
3. During the construction, if the contractor suspects that any material in the building contains or is a hazard material (asbestos, lead, PCB, mercury, etc.) work shall be stopped to prevent disturbance and the Owner shall be notified immediately.

END OF SECTION 23 05 00

SECTION 23 05 03 - BASIC MATERIALS AND METHODS FOR HVAC

I. GENERAL

A. DESCRIPTION

1. Type of piping for various systems shall be as specified herein.
2. All pipe shall be true and straight without sags or traps.

II. MATERIALS

A. REFRIGERANT PIPING/EQUIPMENT DRAIN PIPING

1. All refrigerant and equipment drain piping shall be government type "L" hard copper tube standard weight and thickness as made by Mueller, Chase, Anaconda or equivalent, unless indicated otherwise. Use Silfos 1000 degrees Fahrenheit solder on all joints.
2. Tubing shall be brought to the site with ends sealed.

B. A/C CONDENSATE DRAIN PIPING

1. All A/C condensate drain piping shall be government type "L" hard copper water tube of standard weight and thickness. Fittings shall be compatible with pipe. Use Silfos 1000 degrees Fahrenheit solder on all joints.

C. PIPE FITTINGS

1. All pipe fittings shall be same as piping specified unless indicated otherwise.
2. Fittings for refrigerant piping and other copper lines shall be solder type wrought copper, Nibco or equivalent.

D. PIPE SPECIALTIES

1. Dielectric unions shall be used between copper and iron pipe.

E. PIPE HANGERS AND SUPPORTS

1. This contractor shall furnish and install all foundations and supports required for his equipment unless indicated otherwise on the drawings.

2. This contractor shall furnish and install all escutcheons, inserts, thimbles, hangers, etc., required for the proper support and installation of his equipment and piping. Cooperate with other trades in locating and placing these items.
3. Provide sleeves for all pipes passing through walls, floors, beams, etc. Sleeves passing through structural members shall be of cast iron or Schedule 40 steel pipe unless other material is approved by the Structural Engineer. Sleeves passing through nonstructural walls or floors shall be of Schedule 10 galvanized iron. Joints between sleeves and pipes passing through floors shall be made watertight with plastic materials. Where pipes pass through floors shall be made watertight with plastic materials. Where pipes pass through waterproofing membrane, flashing sleeves shall be installed.
4. Provide malleable iron split ring hangers with rod supports throughout. Strap hangers or wire will not be accepted. Maximum spacing of hangers for cast iron pipes shall be 5 feet; for other than soil, use 10 feet.
5. Provide galvanized iron shields between hangers and pipe covering.
6. Provide chrome plated brass escutcheons wherever pipes pass through floors, walls or ceilings in exposed or finished areas.
7. All piping projecting from chases shall be rigidly supported in the wall or chase. Loosely supported piping or accessories will not be accepted.

F. MOTORS STARTERS AND ELECTRICAL WORK

1. The Mechanical Contractor shall furnish to Electrical Contractor for installation, all motor starters, start-stop push buttons and pilot lights for each piece of motor driven equipment unless shown otherwise.
2. The Electrical Contractor shall install all motor starters, start-stop push buttons and pilot lights as furnished by the Mechanical Contractor. The Electrical Contractor shall do all power wiring required for the installation of all mechanical equipment including equipment interlocking power wiring, etc. Temperature control wiring shall be furnished and installed by the Mechanical Contractor. All work shall be done in accordance with the National Electrical Code requirements and with wiring workmanship, etc., as called for in the Electrical Specifications. The Mechanical Contractor shall provide approved wiring diagrams of all equipment, controls, etc., to the Electrical Contractor for his installation. Coordinate all work to

provide a complete system in working order. All wiring shall be plenum rated.

3. All motors for the mechanical equipment shall be of the 40 degrees Celsius rise type and shall be furnished and installed by the Mechanical Contractor. All motors shall be wound for +/- 10 percent of the specified voltage. Motors shall be voltages indicated on drawings. All motors shall have copper windings, class F insulation and shall be rated for continuous duty service. All three-phase motors shall be inverter-duty type motors.
4. All electrical equipment shall have UL label or ETL label and shall meet the standards of the National Electrical Code and NEMA.
5. Starters for single phase motors 1/2 HP and below shall be furnished with pilot light and "hand-off-auto" selector switch where required.
6. Starters for three-phase, single speed motors shall be stepless solid state soft starter with "hand-off-auto" selector switch, three (3) overload relays and auxiliary contacts as required. The starter shall operate at manufacturers ratings with 10 percent and -15 percent applied voltage tolerance and be capable of operating continuously under ambient temperatures of 0 to 50 degrees Celsius. The starter control circuitry shall be designed for current ramp operation and utilize current feedback for closed loop operation to minimize variation of acceleration time with varying load conditions. The starter shall use metal oxide varistors to clip transient voltage spikes on incoming power lines with protection to limit the rate of rise of voltage spikes to protect the SCR's from damage. The starter shall provide electronic motor overload protection. The starter shall shut down (or shall not start) to protect itself from either phase loss or phase rotation. The starter shall have adjustments for initial torque, pulse, ramp up time, ramp down time, and current limit. The starter shall have a main trip breaker to act as a disconnect and necessary contactors. The starter shall have contacts for remote starting from a building energy management system.
7. Mechanical contractor shall provide and install all smoke dampers and smoke or duct detectors. The electrical contractor shall provide and install all wiring/interlocks with fire alarm.

G. ACCESS PANELS

1. Furnish and install access panels where valves, dampers, etc., are concealed in walls, ceilings, floors or otherwise inaccessible. Panels shall be Milcor, Babcock, Larsen, MIFAB, Acudor, Nystrom or equivalent. All access

panels shall be minimum 18 inches X 18 inches hinged with flush latch and lock. The panels shall be constructed of minimum 16 gauge steel. Frame flange shall be minimum 1-1/2 inches wide. Rated panels shall have U.L. rating for type wall or ceiling where located.

2. Access panels located in rated walls, floors, or ceilings shall be so rated and installed per manufacturer's recommendations to maintain rated integrity.
3. Steel access panels shall be primed and painted color as selected by Architect.

III. EXECUTION

A. PIPING

1. Perforated strap hangers shall not be allowed for any part of the hangers.
2. Pipe shall be cut accurately to measurements established at the building and shall be worked into place without springing or forcing. Care shall be taken not to weaken structural portions of the building. Service pipes, valves, and fittings shall be kept a sufficient distance from other work and other services to permit not less than 1/2 inch between finished covering and other work and not 1/2 inch between finished covering on the different services.
3. Expansion and contraction of piping: Allowance for expansion and contraction shall be made throughout.
4. Tubing shall be cut square, and butts shall be removed. Both inside of fittings and outside of tubing shall be well cleaned with steel wool before sweating. Care shall be taken to prevent annealing of fittings and hard drawn tubing when making connections. Installation shall be made by competent workmen in accordance with manufacturer's recommendation. Mitering of joints for elbows and notching of straight runs of pipe for tees will not be permitted. Joints for soldered fittings shall be made with a noncorrosive paste flux and solid string of wire solder. Cored solder will not be permitted.
5. Pipe sleeve and hangers: These items shall be furnished and set and the contractor shall be responsible for their proper and permanent location.
 - a. Pipe sleeves - Install sleeves for all pipes passing through footings, floors, and walls. Clearance between sleeves and pipe covering and/or pipes shall be approximately 1/4 inch. Construction shall not

be cut except where approved by the Architect. Where cutting of construction is permitted, the construction shall be repaired to match its original condition. Sleeves shall not be installed in structural members except where indicated.

- 1) Install sleeves for pipes that pass through walls. Sleeves that pass through walls shall be cut flush with surfaces. The space between sleeves and pipe or covering shall be sealed with graphite packing and synthetic rubber caulking compound.
 - 2) Install sleeves where pipes pass through waterproofing membrane. The sleeves shall be provided with an integral flashing flange or a clamping device to which a 4 pound lead flashing shield shall be clamped or soldered. The shield shall extend 12 inches from the pipe and shall be thoroughly mopped into the membrane. The space between the sleeve and pipe shall be made watertight by inserting an oakum gasket, filling the remaining space with lead, and thoroughly caulking.
- b. Threaded pipe - Support pipes at 7 foot intervals.
 - c. Copper tubing - Support tubing at not more than 5 foot intervals. Hangers for copper tubing except where protective shields are installed shall have proper size rings to suit outside diameter of tubing and the hangers or supports shall be copper or copper plated at contact surfaces.
 - d. Underground piping - Lay pipe on a firm bed for its entire length, except where support is otherwise provided.
 - e. Vertical piping - Supports shall be at each floor. Horizontal piping - Hangers and supports shall be installed at locations not more than 3 feet from the end of each run out. A hanger shall be installed not over 1 foot from each change in direction of piping.

END OF SECTION 23 05 03

SECTION 23 05 93 - TESTING, ADJUSTING AND BALANCING

I. GENERAL

A. RELATED DOCUMENTS

1. All Division 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.

B. SCOPE OF WORK

1. The HVAC Contractor shall obtain the services of an independent test and balance 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). These services shall not be provided by the installing HVAC contractor on the project but shall be a direct subcontractor of the HVAC contractor.
 - a. Agency shall provide proof of having successfully completed at least five projects of similar size and scope. Work by this Agency shall be done under direct supervision of a qualified Heating and Ventilating Technician employed by Agency.
 - b. Instruments used by Agency shall be accurately calibrated and maintained in good working order.
 - c. If requested, conduct tests in presence of Engineer.
 - d. Agency shall be approved in writing by Engineer. Mechanical Contractor shall not be permitted to do this work. Submit qualifications for review.
2. 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.
3. **Test and Balance agency shall be present for factory start-up of equipment when factory startup is required.**
4. Representatives of the test and balance company shall visit the job site at 60 percent and 90 percent completion of installation of the HVAC equipment, piping and ductwork to review the installation. After each site visit, the test and balance company shall report to the Architect any items

that are not installed properly, are missing from the Contract Documents or items that are required to enable him to perform the testing and balancing of the HVAC systems as per normal standard practice. After review, the Architect shall instruct the contractor to implement the recommendations at no additional cost to the Owner if these items were specified in the original scope of the project.

5. Upon completion of the HVAC system installation, the test and balance company shall perform all testing and balancing with the full cooperation of the contractor and his subcontractors. 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 by the contractor shall be performed at no additional cost to the Owner.
 6. **Balancing agency shall be represented at final inspection meeting by qualified testing personnel with balancing equipment and two (2) copies of air balancing test report.**
 7. The test and balance report shall be submitted to the Architect for review by his Mechanical Engineer. If the Mechanical Engineer agrees with the report, he shall sign it and return it to the Architect. If he does not concur with the report, he shall meet with the Test and Balance Company to determine what needs to be done to obtain a properly balanced system.
 8. After the Mechanical Engineer signs the testing and balancing report, the Test and Balance Company shall supply four (4) copies of the final and complete report to the Architect for inclusion in the Operation and Maintenance Manuals.
- C. The items requiring testing, adjusting, and balancing include (but are not restricted to) the following:
1. AIR SYSTEMS:
Air Handling Units
Fans
Zone Branch and Main Ducts
Diffusers, Registers, Grilles and Dampers
Coils (Air Temperatures)
Duct Pressure Leak Testing
- D. SCHEDULING

1. Contractor shall award test and balance contract to approved agency upon receipt of his contract to proceed to allow Agency to schedule this work in cooperation with other Sections involved and comply with completion date.

E. DEFINITIONS, REFERENCES, STANDARDS

1. 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.

F. QUALIFICATIONS

1. Agency Qualifications: The TAB agency shall be a current member of the AABC, NEBB or TABB.
2. Prior to working on this project, the technicians shall attend training provided by the manufacturer of the various equipment on this project on the specific aspects of balancing the equipment. Include letters or certificates from the manufacturer on attendance and satisfactory completion of the factory training. These certifications may be used for continuing education. At a minimum, the technicians shall receive training from the air distribution equipment manufacturer, air terminal unit manufacturer, air unit manufacturer, pump manufacturer, air cooled chiller manufacturer and temperature controls manufacturer. This should be done prior to any equipment start-ups.
3. Although acceptable to be bidding the project the TAB agency shall provide qualifications and certifications to provide the required services.

G. SUBMITTALS

1. Qualifications: The TAB agency shall submit a company resume listing personnel and project experience in air and hydronic system balancing and a copy of the agency's test and balance engineer or technician certificate.
2. Procedures and Agenda: The TAB agency shall submit the TAB procedures and agenda proposed to be used.
3. 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.

4. Submit continuing education training on each lead technician working on the project.

H. TAB PREPARATION AND COORDINATION

1. Shop drawings, submittal data, up-to-date revisions, change orders, and other data required for planning, preparation, and execution of the TAB work shall be provided when available and no later than 30 days prior to the start of TAB work.
2. System installation and equipment startup shall be witnessed by the TAB agency. The TAB Agency's final Test and Balance shall begin when all factory start-ups are complete.
3. The building control system (BCS) 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 BCS 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. The BCS contractor shall provide all necessary software to the TAB Agency at no additional cost.
4. All test points, balancing devices, identification tags, etc., shall be accessible and clear of insulation and other obstructions that would impede TAB procedures.
5. 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.
6. If, upon commencing the work, the TAB contractor finds that the systems are not ready, or if a dispute occurs as to the readiness of the systems, the TAB contractor may request an inspection to be made by the Designer's Mechanical Engineer. This inspection shall establish to the satisfaction of the represented parties whether or not the systems meet the basic requirements for testing and balancing. Items that are determined to be not ready for testing and balancing shall be completed by the Mechanical Contractor and placed in operational readiness before TAB services are again requested.

I. TAB REPORTS

1. Final TAB Report: The TAB agency shall submit the final TAB report for review by the Engineer. On plans provided, all outlets, devices, HVAC equipment, etc., shall be identified, along with a numbering system corresponding to report unit identification. The TAB agency shall submit an AABC or NEBB "National Project Performance Guaranty" assuring that the project systems were tested, adjusted and balanced in accordance with the project Specifications and AABC or NEBB National Standards.
2. Submit four (4) copies of the final TAB report to the Architect for inclusion in the Operation and Maintenance Manuals.

II. INSTRUMENTATION

- 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 or NEBB National Standards.

III. EXECUTION

A. GENERAL

1. HVAC Contractor shall put heating, ventilating, and cooling systems and equipment into full operation and continue their operation during each working day of testing and balancing.
2. Air Balance and Testing Agency shall perform tests specified, compile test data, and submit four (4) copies of complete test data to contractor for forwarding to Engineer for evaluation and approval.
 - a. Approved copies of report shall be bound in Operations and Maintenance manuals.
3. System shall be completely balanced and all reports submitted to Engineer prior to prefinal inspection.
4. 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 or NEBB National Standards. Adjustment tolerances shall be + or -10 percent unless otherwise stated.
5. 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.

6. 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.
7. 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.
8. 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.

B. AIR SYSTEMS

1. **TESTING PROCEDURE**

Air Balance and Testing Agency shall perform following tests and balance system in accordance with following requirements. Perform the following tests at high and low speeds of multi-speed systems and single speed system.

- a. **Make periodic inspections of the installation of the systems. Provide reports of each inspection. Inspections should be monthly when ductwork installation begins. Coordinate and verify the installation of all balancing dampers, fire dampers, etc.**
- b. Pressure test each low pressure steel duct system to test for air tightness.
 - 1) If ducted systems leak, do not continue with air balance. Report findings to Engineer in writing and begin testing again after Mechanical Contractor has repaired ducts or applied duct sealers.
 - 2) If ducted systems appear air tight, proceed with air balance procedure as outlined below.
 - 3) Include in air balance report a letter indicating leak testing has been accomplished and a report of findings regarding airtightness of each ducted system.
 - 4) Maximum leakage loss shall not exceed 2 percent. If losses are greater, the Mechanical Contractor shall correct the leakage, then the test and balance agency shall retest the ductwork.

- c. Test and adjust blower rpm to design requirements.
 - d. Test and record motor full load amperes.
 - e. Make Pitot Tube traverse of main supply and return and obtain design cfm's.
 - f. Test and record system static pressures, suction, and discharge.
 - g. Test and adjust system for design cfm air.
 - h. Test and adjust system for design cfm outside air.
 - i. Test and record entering air temperatures (db heating and cooling).
 - j. Test and record entering air temperatures (wb cooling).
 - k. Test and record leaving air temperatures (db heating and cooling).
 - l. Test and record leaving air temperatures (wb cooling).
 - m. Adjust main supply and return air ducts to proper design cfm.
 - n. Adjust zones to proper design cfm, supply and return.
 - o. Test and adjust each diffuser, grille, and register to within 10 percent of design requirements.
 - p. Identify each diffuser, grille, and register to location and area.
 - q. Identify and list size, type, and Manufacturer of diffusers, grilles, registers, and testing equipment. Use Manufacturer's rating on equipment to make required calculations.
 - r. In readings and tests of diffusers, grilles, and registers, include required fpm velocity and test fpm velocity and required cfm and test cfm after adjustments.
 - s. In cooperation with Mechanical Contractor, set adjustments of automatically operated dampers to operate as specified, indicated, or noted.
 - t. Adjust diffusers, grilles, and registers to minimize drafts.
 - u. Verify the calibration of temperature control devices, thermostats, etc.
 - v. Verify all control sequences with specifications.
 - w. Include manufacturer's performance data with reports.
 - x. Schedule three (3) inspections to verify original test and balance of systems within 90 days of acceptance by Owner. Make opposite season adjustment and inspection of systems at one year after acceptance by Owner. Submit reports after each inspection. Submit schedule as part of initial report. Submit schedules as part of initial report.
2. Where systems supplied to job site provides over 5 percent more air than schedule requirements, rooms supplied by that system shall have their supply air quantities increased by the ratio of the actual total air quantity supplied to the minimum air quantity required by the schedule.
 3. The TAB agency shall verify that all ductwork, splitters, 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:

- a. Exhaust Fans
 - 1) Fan Speeds--Test and adjust fan RPM to achieve design cfm requirements.
 - 2) 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.
 - 3) Pitot-Tube Traverse--Perform pitot-tube traverse of the 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.
 - 4) Static Pressure--Test and record system static pressure, including the static pressure profile of each exhaust fan.
- b. Zone, Branch, and Main Ducts
 - 1) 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.
- c. Diffusers, Registers, and Grilles
 - 1) Tolerances--Test, adjust, and balance each diffuser, grille, and register to within 10 percent of design requirements. Minimize drafts.
 - 2) Identification--Identify the type, location, and size of each grille, diffuser and register. This information shall be recorded on air outlet data sheets.
- d. Coils
 - 1) Air Temperature--Once air flow is 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.
- e. Air Handling Units:
 - 1) Location, manufacturer, model number, serial number, motor manufacturer, fan and motor sheaves, belts. Required and test data with unit operating at full air flow conditions (all space thermostats calling for cooling) for each of following: total CFM, return and outside air CFM, total static pressure, suction and discharge static pressures across unit fan, HP, amperage, voltage, fan RPM. Verify performance of static pressure controls, vane operators,

- dampers and controls. Adjust and/or change pulleys and belts as required to obtain delivery of system specified or required full load air quantities.
- f. Heat Pump Units--Indoor Section:
 - 1) Location, manufacturer, model number, serial number, and manufacturer. Required and test data with unit operating at full air flow conditions (all space thermostats calling for cooling) for each of following: total CFM, return and outside air CFM, total static pressure, suction and discharge static pressures across unit fan, HP, amperage, voltage, fan RPM. Verify performance controls.
 - g. Heat Pump--Outdoor Section:
 - 1) Both specified and test data for each unit. Verify voltage specified and actual. Full load amps at outdoor conditions. Refrigerant charge.
 - h. Control Systems:
 - 1) Verify all control sequences and calibration of all thermostats and sensors.
 - i. Equipment Start-up:
 - 1) The Test and Balance Contractor shall be on site to witness and record all factory start-up of mechanical equipment. Include start-up reports in final balancing report.

C. ADDITIONAL TAB SERVICES

- 1. 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. Inspections shall be conducted a minimum of two times. (Typically, these are performed when 60 percent of the total system is installed and again when 90 percent of the total system is installed, prior to insulation of the duct and piping.) The TAB agency shall submit a written report of each inspection to the Architect.
- 2. Duct Leakage Testing:

The Installing Contractor shall isolate and seal sections of ductwork for testing. The pressurization fan and test apparatus shall be connected to the test section and the test performed. The test pressure required and the amount of duct to be tested shall be described by the engineer in the appropriate duct classification section. All testing shall be based on one test per section.
- 3. Verification of HVAC Controls:

- a. 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:
 - b. 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.
 - c. Verify that all controlling instruments are calibrated and set for design operating conditions.
4. Temperature Testing:
To verify system control and operation, a series of three (3) temperature tests shall be taken at approximately 2 hour intervals in each separately controlled zone. The resulting temperatures shall not vary more than 2 degrees Fahrenheit from the thermostat or control set point during the tests. Outside temperature and humidity shall also be recorded during the testing periods.

END OF SECTION 23 05 93

SECTION 23 07 00 - MECHANICAL INSULATION

I. GENERAL

A. DESCRIPTION

1. Pipe insulation installation shall not begin until all work has been tested and found to be tight. All insulation shall be UL listed and have a flame spread of less than 25 and a developed smoke rating less than 50. All insulation shall be banded with aluminum bands, three per section. All insulation shall be continuous through walls, floors, ceilings, etc.

II. MATERIALS

A. CONDENSATE DRAIN PIPING

1. Insulate condensate drain piping with 1/2 inch thick closed cell rubber type insulation.

B. REFRIGERANT LINES

1. Insulate all refrigerant suction lines with 1 inch thick closed cell rubber insulation. Apply two (2) coats of black mastic where the lines are exposed to the weather. Refrigerant piping below grade shall be installed in watertight PVC sleeve.

C. EQUIPMENT ROOM WALLS

1. Provide sound absorbing 2 inches thick semi-rigid fiberglass board. The board shall be faced with 8 mil triple-ply laminate composed of a white polypropylene face, with a fiberglass scrim, and an aluminum foil back, all laminated with a flame retardant adhesive. The fiberglass board and the facing shall meet flame spread of not greater than 25, and a smoke developed rating of not greater than 50.
 - a. Insulation shall be installed by impaling on stick-pins with a suitable adhesive (no self stick pins may be used). After material is impaled on pins, the tip of the pin shall be covered with a white dome-cap washer. All joints, corners, and exposed edges shall be covered with the facing material. Remove and replace any damaged insulation with new material.

D. AIR CONDITIONING DUCTWORK

1. Insulate all ducts above ceiling with one layer of 3 inch thick, 3/4 pound density flexible Fiberglass duct insulation with aluminum foil facing. Duct insulation to be applied with 2 inches lap of facing sealed with tape and outward clinch staples. Seal all joints with 2 inch wide vapor barrier tape. An additional band of tape shall be applied between the circumferential joints for a maximum 2 foot spacing of taped bands.
2. The ductwrap shall have a minimum installed R-value of 8.0 and shall comply with Energy Code requirements.
3. Ductwork exposed at exterior shall be internally lined.

E. HORIZONTAL WASTE PIPING

1. All waste lines and traps above slab which receive condensate from air conditioning equipment shall be insulated same with 2 inch thick, 3/4 pound density fiberglass insulation with aluminum foil vapor barrier or closed cell rubber insulation. Exposed piping shall have PVC jacket similar to domestic water piping.

F. INSULATION BANDS

1. All pipe insulation shall be banded with nylon tie-wrap bands, three (3) to a section, and with one band on each side of each fitting, valve, etc.

G. FLANGES, VALVES AND FITTINGS

1. All flanges, valves and fittings shall be insulated with fabricated fiberglass molded fitting insulation, using factory fabricated fittings up to 3 inches and fabricated mitered segments of pipe insulation equal in thickness to the insulation to the adjoining pipe. All fabricated mitered segments shall be covered with matching embossed vapor barrier laminate.

III. INSTALLATION

- A. Provide clearance for installation of insulation and for access to valves, air vents, drains and unions.

1. Insulation Installation:
 - a. Do not install covering before piping has been tested and approved.
 - b. Ensure piping surface is clean and dry prior to installation.
 - c. Ensure insulation is dry before and during application.

- d. Insulation shall be continuous through walls, floors and ceiling. Pack around pipes with fire proof self-supporting insulation material, fully sealed.
- e. Insulate fittings and valves. The end of the insulation shall be fitted with a metal escutcheon plate with set screw or taped neatly with pressure sensitive fiberglass reinforcing cloth.
- f. All joints shall be sealed with 3 inch wide fiberglass reinforcing cloth with pressure sensitive adhesive.
- g. Pipe insulation at Hangers and Supports: Pipe insulation at hanger and support shall be protected with a half circular shield of the size of the insulation and 12 inches long constructed from 20 gauge galvanized steel. The shield shall be held in place with the fiberglass reinforcing cloth and pressure sensitive adhesive. Where pipes pass through walls, ceiling and floor in finished areas, escutcheon plates shall be installed to encompass pipe and insulation. Escutcheon plates shall be chromed brass or stainless steel and shall be either solid or the clamp on split type.
- h. Painting of fiberglass pipe jacket is not required. Piping shall be painted colors as standard in this facility.

END OF SECTION 23 07 00

SECTION 23 09 00 - TEMPERATURE CONTROLS

I. GENERAL

A. GENERAL REQUIREMENTS

1. Refer to Section 23 05 00, Section 23 05 03, Section 23 30 00 and Section 23 70 00, provisions of which apply to work under this Section.
2. All control systems shall be furnished complete and functioning.
3. Coordinate all control work with the mechanical and electrical contractors. Contact the Test and Balance Contractor and notify them as to when controls work shall be installed. Test and Balance controller shall verify controls systems installation and proper operations.

B. DESCRIPTION OF WORK

1. Provide a complete system of “hard-wired” automatic controls (wireless unacceptable) as indicated herein. Control system shall consist of all thermostats, sensors, actuators, operators, wiring, switches, relays and control panels necessary to accomplish the control sequence specified herein.

C. RELATED WORK IN OTHER SECTIONS

1. For extent of power wiring and connection to mechanical equipment under Electrical Work, refer to Division 26.
2. For control devices furnished with equipment, refer to equipment specifications and schedules. Any controls equipment not specifically called for elsewhere shall be provided by controls contractor. All control wiring shall be done by controls contractor.
3. All power for control devices such as actuators, operators, fire/smoke dampers, control dampers, etc. shall be furnished, installed and wired by the Controls Contractor. Controls Contractor may use 24 VAC or 120 VAC for the control system. The controls contractor shall be responsible for obtaining the necessary power and pay all costs associated with obtaining power to controls and controls equipment.
4. All interior control wiring shall be installed in galvanized EMT conduit. The last 6 inches at connection to equipment shall be flexible metal

conduit. All control wiring on exterior of building shall be in Seal-Tite conduit and/ or Liquid Tight flexible conduit.

5. All control wiring shall be furnished and installed by this contractor.

D. SERVICE

1. Installing Contractor (Mechanical Contractor or subcontractor under the Mechanical Contractors) shall maintain adequate automatic control personnel on his payroll to provide back-up project control service on the automatic control system provided under this contract.

E. WARRANTY

1. Contractor shall warranty all work performed under this contract to be free of any defects in workmanship or material for a period of 1 year after final acceptance by the Owner's representative. The installing controls contractor shall include a second year of extended warranty to cover all parts and labor. The warranty and extended warranty shall include quarterly calibration and set-up checks of all controls. THIS WARRANTY DOES NOT START ON DATE THAT THE MECHANICAL EQUIPMENT IS STARTED.

F. SUBMITTAL

1. Submit shop drawings and product data sheets indicating configuration, general assembly, and materials used in fabrication.
2. Submit manufacturer's installation instructions. Instructions shall include complete wiring diagrams drawn specifically for this project.

G. OPERATION AND MAINTENANCE

1. Include manufacturer's descriptive literature, operating instructions, and maintenance data.

H. QUALITY ASSURANCE

1. Manufacturer shall be a company specializing in products of the type specified in this section. All components shall be Class A quality commercial or industrial grade for installation in locations or environments shown on plans.

I. SYSTEM RESPONSIBILITY

1. The entire control system, shall be furnished by a single source manufacturer who shall be responsible for the entire system. The installation shall be by technicians employed by the controls system manufacturer.

II. PRODUCTS

A. FIRESTATS AND SMOKE DETECTORS

1. Duct smoke detectors shall be furnished and installed by mechanical contractor. Install a smoke detector in the supply air section/duct and return air section/ duct of each unit delivering over 2000 cfm to stop the fan and close the outside air dampers in the event of excessive temperature or smoke. Firestats to be provided in the return air units of all units over 600 cfm.
2. Smoke detectors shall be addressable and compatible with the fire alarm system.
3. Where and when the building does not have a fire alarm system, provide a remote annunciator with remote reset for each detector.
4. All smoke detectors shall have remote reset.

B. WIRING

1. Factory mount and wire HVAC equipment controls. Mount electrical components in unit control box with removable cover. Provide clearance for access to controls (36 inch clearance).
2. Provide terminal strip(s) for field wiring of thermostat, communications and power source. DO NOT USE WIRE NUTS IN JUNCTION BOX.
3. All wiring shall comply with local and national electric codes and the manufacturer's published installation manual.
4. Provide terminal strip(s) for field wiring of air conditioning unit input connections, duct temperature sensor, velocity sensor, static pressure sensor, communications, start/stop devices, VFD controls, time clock, bypass damper motor and power wiring, etc. Do not use wire nuts on loose wire. All wire shall be in conduit, flexible conduit or wiring harness.

C. THERMOSTAT

1. Provide fully automatic room-type electronic programmable thermostat as indicated on plans to cycle outdoor unit on cooling cycle and heating cycles as required to maintain space conditions. Thermostat shall have the following features:
 - a. Designed for use with the type of system used.
 - b. "Auto-On" fan selector switch for constant or automatic fan operation.
 - c. "Auto-Off" selector switch to energize unit to fully automatic change-over from heating to cooling mode.
 - d. Temperature selector switch with concealed screw-type maximum set points for heating and cooling mode.
 - e. Thermostat shall be programmable for automatic temperature set-up or setback for occupied and unoccupied times minimum two per day.
 - f. Shall have an LED or LCD read out display.
 - g. Battery back-up should loss of building power occur.
 - h. Button type or touch sensitive keypad for data entry in to the thermostat.
 - i. Thermostat range of operation shall be 55 degrees Fahrenheit – 85 degrees Fahrenheit in heating or cooling mode.
 - j. Thermostat shall maintain humidity setpoint. Humidity setpoint shall be adjustable by the user.

III. EXECUTION

A. INSTALLATION

1. Division 26, ELECTRICAL, shall be responsible for point to point wiring of all starters and starting switches not factory installed in the HVAC equipment.
2. Install all components of control systems under this Section using experienced control mechanics, all in the regular employ of the Installing Contractor, or the apparatus manufacturer.

B. WIRING

1. Install all control, pilot circuit and interlock wiring, including wiring through interposed safety or other auxiliary control devices within the confines of the mechanical equipment only. Wiring of thermostats shall be by the Mechanical Contractor.

2. All wiring shall conform to the Local and National Electrical Codes.
3. All control and interlock wiring shall be fused at conductor capacity as shown in the National Electrical Code.
4. No splices will be allowed except at junction boxes and control centers.
5. All wires to each control device must be different colors. All wires to each device must be laced or tied at point of entry into control panel and tagged as to its point of origin.
6. All wires shall be run directly from controller or controlled device to control center. There shall be no looping of wires from one device to another external to the control centers.
7. Control voltage shall be a maximum of 120-volt, unless otherwise indicated herein.
8. Control or interlock wiring shall not be run in conduit with any power wiring other than that serving the equipment controlled.
9. Refer to Division 26, ELECTRICAL, for extent of work under that Division. Provide other wiring systems required to accomplish the work of this Section, following requirements of Division 26 for products and execution.
10. Wiring connection to terminal posts shall be made by means of compression type lugs. Wire splices shall be made with sketch locks.
11. Safety devices in motor control circuits shall be wired to interrupt the holding coil circuit regardless of the position of any selector switches in the circuit.
12. Control circuit conductors shall be sized for a maximum voltage drop of 10 percent of the circuit voltage.
13. All electrical power wiring shall conform in all respects with the provisions of the National Electrical Code and Division 26, ELECTRICAL, of the Specifications.
14. Provide all necessary contactors, switches, transformers to accomplish operating sequences.

C. SYSTEM CHECK-OUT

1. Check-out each system for control function through entire sequence, check calibration of instruments, reset instruments control points.
2. Owner maintenance personnel shall be made thoroughly familiar, by the contractor, with the operation and service of the project automatic temperature control circuits.

IV. SEQUENCE OF OPERATION

A. FURNACE/COOLING SYSTEMS

1. When thermostat switch is set in the "on" position, the indoor unit fan shall run continuously. When thermostat fan switch is set in the "auto" position, the indoor unit fan shall cycle with compressor operation or the control valve for heating.
2. The thermostat shall cycle the compressor(s) as required to maintain thermostat set points in cooling mode or furnace in the heating mode. Thermostat shall switch modes automatically.
3. Thermostat shall be programmable for occupied and unoccupied time periods and temperatures.
4. Indoor units shall be electrically interlocked such that neither outdoor unit may not be energized unless indoor unit fan is running.

B. HEAT PUMP SYSTEMS

1. When thermostat switch is set in the "on" position, the indoor unit fan shall run continuously. When thermostat fan switch is set in the "auto" position, the indoor unit fan shall cycle with compressor operation.
2. The thermostat shall cycle the compressor(s) as required to maintain thermostat set points in heating or cooling thermostat shall switch modes automatically. Thermostat shall energize auxiliary strip heater as required during low outdoor ambient periods and defrost cycles.
3. Thermostat shall be programmable for occupied and unoccupied time periods and temperatures.
4. Indoor units shall be electrically interlocked such that neither outdoor unit nor auxiliary strip heaters may not be energized unless indoor unit fan is running.

5. Smoke detector shall de-energize indoor unit fan on sensing smoke in the supply duct leaving the indoor unit.
6. Firestats shall de-energize indoor unit fan on high return air temperature (125 degrees Fahrenheit).

C. AIR CONDITIONING SYSTEMS

1. When thermostat switch is set in the "on" position, the indoor unit fan shall run continuously. When thermostat fan switch is set in the "auto" position, the indoor unit fan shall cycle with compressor operation.
2. The thermostat shall cycle the compressor(s) as required to maintain thermostat set points in the cooling mode and electric heat in the heating mode. Thermostat shall switch modes automatically.
3. Thermostat shall be programmable for occupied and unoccupied time periods and temperatures.
4. Indoor units shall be electrically interlocked such that neither compressor may not be energized unless indoor unit fan is running.
5. Smoke detector shall de-energize indoor unit fan on sensing smoke in the supply duct leaving the indoor unit.
6. Firestats shall de-energize indoor unit fan on high return air temperature (125 degrees Fahrenheit).

END OF SECTION 23 09 00

SECTION 23 30 00 - AIR DISTRIBUTION

I. GENERAL

A. GENERAL

1. Furnish and install all ducts for Air Conditioning, Heating, and Ventilating Systems as shown on the plans and as may be required to provide complete system. Ductwork shall be complete with grilles, vanes, flashings, hangers, flexible connections, splitters, manual dampers, fresh air inlets, louvers, reinforcing angles, etc. All ductwork shall be concealed and insulated as hereinafter specified.

B. COORDINATION

1. The General Contractor and Mechanical Contractor shall coordinate the space clearances required for ductwork with the structure, ceilings, lights, sprinklers, etc. In some cases, due to space limitations, it may be necessary to re-size ductwork to meet the conditions of the project. Any re-sizing required shall be part of this project and done without any additional cost to the project. DO NOT MAKE DUCTWORK WITHOUT COORDINATION.

C. DUCTWORK SHOP DRAWINGS

1. The Mechanical Contractor/ Sheetmetal Contractor shall prepare complete sheetmetal ductwork shop drawings showing coordination with all trades on the project. The shop drawings shall show all offsets, transitions, size changes to resolve conflict, dampers, fire dampers, grilles, air units, etc. These shop drawings shall be submitted prior to starting work and ductwork fabrication. Required for fabric duct systems only.

- D. Sealing or flashing the building envelope due to penetrations in the building shall be the responsibility of the general contractor.

II. MATERIALS

A. DUCT HANGERS AND SUPPORTS

1. All ductwork shall be properly braced to prevent rattling, breathing, or other unnecessary noise. No sharp edges or obstructions shall project into air stream.

B. LOW PRESSURE DUCTWORK

1. All ductwork shall be galvanized steel and shall be of gauges and construction as recommended by ASHRAE Guide and Data Book and SMACNA guidelines. Gauges are as follows with longest side governing.

Dimension of longest side	Low Pressure Ductwork Sheet Metal Gauge
0"-12"	26 gauge
13"-30"	24 gauge
31"-54"	22 gauge
55"-84"	20 gauge

2. Low pressure ductwork shall be all exhaust ducts, return air ducts, fresh air ducts and supply ducts.
3. Exterior ductwork shall be paint grip galvanized primed and painted color as selected by Architect.
4. Joints and reinforcing shall be as per ASHRAE Guide and Data Book and lips shall be installed without edge of internal part of slip facing downstream.
5. Construction standard of Article 110, of the National Board of Fire Underwriters Bulletin 90, latest edition, shall apply throughout.
6. Flashings shall be of sheet copper and shall be furnished and installed around all outside openings used for ducts of fans and wherever required. Roof flashings shall extend at least 8 inches above roof.
7. All ducts shall be straight and true and installed in a neat and workmanlike manner.
8. All edges shall be straight and true and all bends shall be made with veined turns. Where long radius turns cannot be used, the contractor shall use square turns and use air splitters spaced not more than 3 inches center to center, and of a length so air will be properly distributed over ducts.
9. All ducts shown are metal to metal dimensions.
10. Mastic shall be applied to both male and female connections (all seams and joints) to make all duct joints air tight (applies to all ductwork; round or rectangular). Surplus mastic shall be removed. Tape and re-mastic joints if necessary. Mastic (hard-cast or equivalent duct sealer: tape not

acceptable) shall be applied to the joints during assembly so that sealant is on all mating surfaces of the joint.

C. FABRIC DUCT

1. Fabric duct shall be Ductsox or equal, non-porous fabric with round orifices sized for required airflow. Furnish with Skelecore FTS with direct hang cable. Provide adjustable airflow device (AFD) as required to achieve airflow. Color shall be selected by Architect.

D. DUCT LINERS

1. Low pressure exterior rectangular ductwork shall be lined with 2 inch thickness black neoprene coated glass fiber duct lining with thermal resistance factor "R" of not less than 8.0 square foot-hour-degree Fahrenheit per BTU. Lining material to be as made by Knauf, Johns Manville, Owens Corning or approved equivalent. Sheet Metal Contractor shall exercise care in cutting and fitting lining material to interior of duct. Cuts should be sharp and clean with joints and fits tight. Lining material is to be applied by buttering on back and edges of sheets with 1/8 inch FC-104 or equivalent, waterproof duct lining cement, cement applied with serrated trowel or similar tool so a grooved application of cement results. Lining material shall be treated with an anti-microbial growth agent compliant with ASTM C1338, G21, G22.
2. Lining material is to be further secured in place with sheet metal screws or grip nail fasteners automatic machine installed (no magnetic hammer) on 12 inch to 18 inch centers. These screws shall run from outside of duct through lining material and into rectangular sheet metal caps held in place against inside face of lining material.

E. FILTERS--PRIMARY

1. Units shall be equipped with low velocity filter section with 30 percent efficient 2 inches thick pleated type (Continental air filters "cono pleat" FARR 3030, American Air Filter or equal) throwaway filters.
2. Provide and install one set of filters as called for in these Specifications for initial testing and start-up and another complete set upon completion of the project.

F. DUCT ACCESSORIES

1. Dampers of the fusible link operated type shall be provided in all ductwork passing through floor or fire walls.

2. Provide quadrant or adjustable splitters and mark shaft to give position of splitter damper in duct.
3. Provide vanes behind every supply grille or diffuser. Splitters shall be provided where shown on plans and where located in concealed non-accessible space provided Young Regulators to operate splitter. Vanes shall be Tuttle and Bailey "Ducturns", Barber-Coleman, Uniflo, or equivalent. Shop fabricated vanes will be acceptable. All dampers shall be constructed of 14 gauge steel.

G. REGISTERS, GRILLES AND DIFFUSERS

1. Ceiling supply outlets, unless otherwise indicated on plans shall be Anemostat/Waterloo, Metalaire, Krueger, Titus, Price, Nailor or approved equal. Outlets shall be mounted tight to the construction, and shall have frame suitable for type of ceiling used unless otherwise noted.
2. Anemostat/Waterloo, Krueger, Metalaire, Titus, Price, Nailor or approved equivalent, extruded aluminum double deflection supply registers with opposed blade volume dampers. Volume extractors extending into duct shall be installed where shown.
3. Return air grilles shall be as manufactured by Anemostat/Waterloo, Krueger, Metalaire, Titus, Price, Nailor or approved equivalent and shall be of style called for on plans.
4. All supply outlets shall have sponge rubber gaskets.
5. All grilles, diffusers, and registers shall be of sizes indicated on plans or scheduled on drawings.
6. Unless otherwise shown on drawings, all grilles installed in the ceiling shall be furnished with white baked-on enamel finish.

H. STATIONARY LOUVERS

1. Louver shall be manufactured by Ruskin HZ700, Greenheck EHV-901 or approved equal, AMCA 550 listed with horizontal blades on exterior face. Louver shall meet AMCA 540 and AMCA 550 listing with the Air Movement and Control Association Certified Ratings Program.
2. Louver Construction
 - a. Fabrication: Extruded aluminum stationary louver style.

- 1) Frame: Double frame design.
 - a) Frame Depth: Exterior frame depth is 2 inches (51 mm) and interior frame depth is 6 inches (153 mm). Overall combined frame depth is 8 inches (203) nominal.
 - b) Wall Thickness: 0.060 inch (1.5 mm) and 0.095 inch (2.4 mm) nominal.
 - c) Material: Extruded aluminum, Alloy 6063-T6.
- b. Blades:
 - 1) Style: Sight proof.
 - 2) Material: Extruded aluminum, Alloy 6063-T6.
 - 3) Wall Thickness: 0.080 inch (2.1 mm) and 0.062 inch (1.6 mm) nominal.
 - 4) Blade Depth: Exterior blades are 2 inches (51 mm) deep, interior blades are 6 inches (153 mm) deep.
- c. Sill: Sill Flashing: Formed aluminum, 0.081 inch (2.0 mm), upturned sides to prevent water leakage.

3. Performance Data:

- a. Performance Ratings: AMCA licensed.
 - 1) Based on testing 48 inches by 48 inches (1219 mm by 1219 mm) size unit in accordance with AMCA 500.
- b. Free Area: 31 percent, nominal.
- c. Maximum Recommended Air Flow through Free Area: 2261 feet per minute (11.5 m/sec).
- d. Air Flow: 11,375 cubic feet per minute (322 cu. m/min).
- e. Maximum Pressure Drop (Intake): 0.45 inches w.g. (0.11 KPa).
- f. Louver shall be certified to Miami-Dade standards TAS 201 (Large Missile Impact), TAS 202 (Uniform Static Air Pressure) and TAS 203 (Cyclic Wind Loading).
- g. Wind load Test Performance: Maximum wind load of ± 130 PSF (6.22 kPa) design wind loads tested per Miami-Dade County Uniform Wind Pressure Test TAS 202.
- h. Wind-driven Rain Performance:
 - 1) Effectiveness Ratio: 99.9 percent effective at preventing water penetration through louver when tested at 50 miles per hour (81 km/h) wind with 8 inches per hour (203 mm/h) rainfall and 2261 feet per minute (11.5 m/sec) airflow through the free area. Penetration Class 'A' in accordance with AMCA 500-L Wind Driven Rain Test.
 - 2) Effectiveness Ratio: 99.9 percent effective at preventing water penetration through louver when tested at 29 miles per hour (46.4 km/h) wind with 3 inches per hour (76 mm/h) rainfall and 2247 feet per minute (11.4 m/sec)

airflow through the free area. Penetration Class 'A' in accordance with AMCA 500-L Wind Driven Rain Test.

4. Louvers shall be provided with rear mounted blade supports as required to comply with wind load criteria.
5. Insect Screens:
 - a. Aluminum: 18-16 mesh, mill finish, .011 inch (0.3 mm) wire.
 - b. Frame: Aluminum.
6. Finish: 70 percent PVDF: Finish shall be applied at 1.2 mil total dry film thickness. Color as selected by Architect from manufacturer's standard and custom color charts.

I. PRE-INSULATED FLEXIBLE DUCT

1. Flexible duct shall be rated for a maximum pressure of 16 inches (4-10 inches I.D.) or 10 inches (12-16 inches I.D.) water column positive pressure and 2 inches water column maximum negative pressure and 6000 FPM maximum velocity and listed by Underwriters Laboratories, Inc. under UL Standard 181 as a Class 1 air duct complying with NFPA Standards 90A and 90B. Flexible air duct shall be factory-made and composed of an inner duct of woven and coated fiber glass fabric providing an air seal and permanently bonded to coated steel wire helix, a fiber glass insulating blanket with minimum R-8.0 value (minimum 2 inch thickness) and low permeability outer vapor barrier of fiberglass reinforced metalized film laminate. Flexible air ducts shall be Thermaflex Everclean or Flexmaster type 4M with minimum R-8.0 insulation to meet ASHRAE 90.1 energy code. Maximum installed length shall not exceed 3 feet-0 inches without approval.

III. INSTALLATION

A. DUCTS

1. Ductwork shall be constructed and installed as follows:
 - a. Straight and smooth on inside with joints neatly finished unless otherwise directed.
 - b. Duct panels through 48 inch dimension having acoustic duct liner need not be crossbroken or beaded.
 - c. Crossbreak unlined ducts and duct panels larger than 48 inches or bead 12 inches on center.
 - d. Securely anchor ducts to building structure with specified duct hangers attached with screws.

- e. Brace and install ducts so they shall be free of vibration under all conditions of operation.
 - f. Ducts shall not bear on the top of structural member.
 - g. Make duct take-offs to branches, registers, grilles, and diffusers as detailed on Drawings.
 - h. Properly flash where ducts protrude above roof.
 - i. Install internal ends of slip joints in direction of flow. Make joints air tight using specified duct sealer.
- 2. Install flexible duct connections to each air handling unit.
 - 3. Provide each take-off with an adjustable volume damper to balance that branch.
 - a. Anchor dampers securely to duct.
 - b. Install dampers in main ducts within insulation.
 - c. Dampers in branch ducts shall fit against sheet metal walls, bottom and top of duct, and be securely fastened.
 - d. Where concealed ceiling damper regulators are installed, provide a cover plate.
 - 4. Install grilles, registers, and diffusers.

B. AIR TURNS

- 1. Permanently installed, consisting of curved metal blades or vanes arranged to permit air to make abrupt turn without appreciable turbulence, in elbows of supply and above ground return ductwork.
- 2. Air turns shall be quiet and free from vibration when system is in operation.

END OF SECTION 23 30 00

SECTION 23 70 00 - AIR CONDITIONING

I. GENERAL

A. DESCRIPTION

1. The Air Conditioning System, in general, shall be for the entire building providing cooling and dehumidification in summer and heating in winter. A constant amount of fresh air shall be taken into the system and all air shall be filtered.
2. The General Contractor (Prime Contractor) who has the contracts with the Owner shall be responsible for installing the mechanical systems using qualified subcontractors and/or employees. Any incorrect or improper work shall be corrected by the General Contractor.
3. The General Contractor shall be the sole source responsible party to furnish and install the mechanical system. General Contractor shall be properly licensed to perform this work.

B. STANDARDS

1. All air conditioning equipment shall comply with the requirements of applicable ARI standards and shall be tested, rated, labeled, and listed accordingly.

C. SPACE REQUIREMENTS

1. General Contractor and Mechanical Contractor shall refer to architectural, structural and electrical drawings and install all equipment, piping, etc. to meet building and space requirements. No equipment shall be bid on or submitted for approval if it will not fit into the space provided or coordinate with other trades involved on the project.

D. COMPRESSOR WARRANTIES

1. On all packaged and/or split system DX equipment 5 tons and below, the manufacturer shall provide a full 10 year labor and material warranty for any and all compressor failures during the warranty period. This warranty is for labor, materials and refrigerant for the compressor replacement.
2. On all packaged and/or split system DX equipment 6 tons and larger, the manufacturer shall provide a full 5 year labor and material warranty for

any and all compressor failures during the warranty period. This warranty is for labor, materials and refrigerant for the compressor replacement.

3. The manufacturer shall warranty all parts, labor and refrigerant systems on the entire unit for the warranty period. In addition, annually, the manufacturer's service technicians shall make a warranty check inspection of the unit with report to the Owner. This warranty shall not include any equipment maintenance; all equipment maintenance is the responsibility of the Owner. The manufacturer shall have full access to the units during the construction period.
4. If a longer warranty period is required elsewhere in these specs, the longer warranty period shall apply.

II. MATERIALS

A. PIPING

1. All piping shall be of materials as hereinbefore specified.

B. PACKAGED ROOF-TOP UNITS

1. Unit shall be a one-piece air-cooled electric cooling, gas heating unit. .
2. Unit compressors shall be serviceable semi-hermetic or welded full hermetic with crankcase heater and suitable vibration isolators. The compressors shall have a five year parts and labor warranty which include all refrigerant charges.
3. Indoor and outdoor coils shall be of nonferrous construction with aluminum plate fins mechanically bonded to seamless copper tubes with all joints brazed.
4. Indoor blowers shall be forward curved, centrifugal, belt-driven type capable of delivering capacity at 10 percent above the scheduled external static pressure. Outdoor fans shall be of the propeller type, with direct-driven permanently lubricated motor.
5. Unit cabinet shall be constructed of galvanized steel, bonderized and coated with a baked enamel finish. Cabinet interior shall be insulated with 1 inch thick neoprene-coated fiberglass insulation. Cabinet panels shall be easily removable for service to all operating components. A condensate drain for the indoor coil shall be provided.

6. The cooling system shall be protected with high pressurestats, low pressurestats, loss-of-charge protection, indoor coil freezestats, and current and temperature sensitive overload devices.
7. Heat exchanger shall be tubular in design and constructed of corrosion-resistant aluminized steel. Heat exchanger shall carry a 10 year warranty. Burners shall be constructed of aluminum painted cold rolled steel and be of the in-shot type.
8. Heating controls shall consist of a redundant gas valve, intermittent pilot ignition, remote pilot flame sensor, time-delay relay, limit switches and centrifugal switch.
9. Cabinet shall contain suitable openings for routing of all utility connections. The base unit shall contain a terminal strip in the control compartment to allow for terminal-to terminal connection of room thermostat and field-installed accessories.
10. Thermostat assembly shall provide staged heating and cooling, automatic changeover and fan control. Space temperature adjustments to the thermostat shall be made at this remotely with the thermostat sensing element located in the unit return air opening.
11. A solid-state outdoor air fan speed control to permit unit to operate down to 0 Fahrenheit shall be provided.
12. Time delay circuit to prevent compressor short cycling as a result of a rapid change in thermostat setting. Also, automatically prevents compressor restart for at least five minutes after shutdown.
13. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
14. Unit casing shall be capable of withstanding Federal test method standard No. 141 (Method 6061) 500 hour salt spray test.
15. Refrigerant Components:
 - a. Refrigerant circuit shall include:
 - 1) Acutrol feed system.
 - 2) Filter drier.
 - 3) Reversing valve.
 - 4) Accumulator.

16. Filter Section:
 - a. Standard filter section shall consist of factory-installed low velocity, disposable 2 inch thick glass fiber filters of commercially available sizes.
 - b. Filter face velocity shall not exceed 320 fpm at nominal airflows.
 - c. Filter section should use only one size filter.
17. Controls and Safeties:
 - a. Unit shall be complete with self-contained low-voltage control circuit, protected by a manually resettable circuit breaker.
 - b. Unit shall incorporate a solid-state compressor protector which provides reset capability at the space thermostat, should any of the following safety devices trip and shut off compressor:
 - 1) Compressor over temperature.
 - 2) High-pressure switch.
 - 3) Loss-of-charge/low-pressure switch.
 - 4) Freezestat, evaporator coil.
18. Operating Characteristics:
 - a. Unit shall be capable of starting and operating at 115 Fahrenheit outdoor ambient temperature per maximum load criteria of ARI Standard 210/240 at $\pm 10\%$ voltage.
 - b. Compressor with standard controls shall be capable of operation down to 25 Fahrenheit ambient outdoor temperature in cooling duty.
 - c. Compressor shall be capable of operation in heating duty down to -20 Fahrenheit ambient outdoor-air temperature.
19. Electric Requirements:
 - a. All unit power wiring shall enter unit cabinet at a single factory-predrilled location.
20. Motors:
 - a. Compressor motor shall be cooled by suction gas passing through motor windings, and shall have line break thermal overload protection.
 - b. Indoor blower motor shall have permanently lubricated bearings and inherent automatic reset thermal overload protection.

- c. Outdoor totally enclosed motor shall have permanently lubricated bearings, and inherent automatic reset thermal overload protection.

21. Two-Position Damper:

- a. Two-position damper package shall include single-blade damper and motor. Admits up to 100 percent outdoor air.
- b. Damper shall close upon unit shutoff.

22. Compressor Cycle Delay:

- a. Compressor shall be prevented from restarting for a minimum of five minutes after shutdown.

23. Head Pressure Control Package:

- a. Consists of solid-state control and condenser-coil temperature sensor to maintain condensing temperature between 90 degrees Fahrenheit and 110 degrees Fahrenheit at outdoor ambient temperatures down to -20 degrees Fahrenheit by either condenser-fan speed modulation or condenser-fan cycling.

24. Hail Guard:

- a. Hail guard shall protect against damage from hail and flying debris.

C. HEAT PUMP - OUTDOOR SECTION

- 1. Furnish and install heat pump - outdoor section where shown and with capacities scheduled on plans. Unit shall be completely factory assembled and tested. Heat pumps must meet or exceed the energy efficiencies of the IECC 2021.
- 2. Condenser coil shall be of nonferrous construction with aluminum plated fins mechanically bonded to seamless copper tubes.
- 3. Condenser fan shall be propeller type, direct driven. Motor shall have inherent protection and be of the permanently lubricated type, resiliently mounted. Fans shall have safety guards.
- 4. Units shall be designed for operation down to 0 degrees Fahrenheit outdoor temperature.

5. Compressor shall be of sealed hermetic design with external spring isolators. Compressors shall have five year replacement warranty by the unit manufacturer (not the compressor manufacturer). Warranty period shall start when project is accepted by the Owner.
6. All controls shall be factory wired and shall consist of high and low pressurestats, compressor and condenser fan overload devices, etc., as required by manufacturer for complete unit protection.
7. Casing shall be fully weatherproof for outdoor installation and shall be bonderized steel with baked enamel finish. Panels shall be removable to provide access for servicing.
8. Unit shall be Trane, Daikin, Lennox, York/JCI or Carrier. Units shall be furnished with factory start-up and check by factory service representative; provide report to Architect. Factory start-up shall not be performed by the installing contractor.

D. HEAT PUMP - INDOOR SECTION

1. Furnish and install heat pump - indoor section of size and type as scheduled on the drawings. Units shall be Trane, Daikin, York/JCI, Lennox or Carrier.
2. Units shall be complete with fan, motor, drive, direct expansion cooling coil, grease fittings, drain pan, etc., and shall have capacities scheduled on plans. All units shall be factory insulated on the interior with not less than 3/4 pound density neoprene coated fiberglass cemented in place with waterproof adhesive.
3. Each unit shall be mounted on a suitable base to allow return air and designed for continuous operation at the maximum rated static pressure. Fan capacities shall be rated with the fans in the units, and horsepowers specified shall include all losses.
4. Casings shall be suitable for operation at the pressures specified and constructed of bonderized steel.
5. Cooling coils shall be of the nonferrous tube and nonferrous fin type and shall be tested at 400 psi air pressure. Cooling coil face velocity shall not exceed that guaranteed by manufacturer for no moisture carry-over.

6. Electric strip heaters shall be as hereinafter specified and shall be mounted inside unit housing. Coordinate electric service to heaters and blower with Electrical Contractor.
7. Filter shall be 1 inch thick throw-away mounted in factory filter rack in unit.

E. AUXILIARY ELECTRIC STRIP HEATERS

1. Provide UL and CSA approved electric heat modules for installation directly on fan discharge. Electric heaters shall be furnished in capacities as scheduled with one or two stage control, single-point electric power connection and terminal strip connections.
2. Electric heater elements shall be constructed of heavy duty nickel chromium elements internally wye connected on 480/600 volt, three-phase and delta connected on 208/240 volt, three-phase.
3. All terminal studs, nuts and washers shall be stainless steel, insulated with phenolic terminal bushings. Terminals shall be machine crimped to coils and heater shall be tested at 2000 volts before shipment. All voltages and phases shall be as scheduled.
4. Heaters shall be provided with built-in contactors with one internally fused terminal block with separate contactors for each stage of heating. Heater shall be internally wired at factory to receive one electrical source of power for air unit-heater combination.
5. Each 208/240 volt heater shall have pilot duty with secondary backup fuse links for automatic reset of high limit controls. Each 480/600 volt heater shall have automatic line break high limit controls.
6. Control circuit transformer shall be built into heater terminal box and sized to carry full contactor holding coil load. Heaters shall be listed by UL.
7. Heater shall be equipped with built-in pressure type air flow switch.
8. Heater shall be installed inside unit housing as recommended by equipment manufacturer.

F. VENTILATING SYSTEM

1. This contractor shall furnish and install all exhaust and supply fans shown and scheduled on plans. Fans shall be of the type indicated and shall be Acme, Loren Cook, Greenheck, Ilg, or equal.
2. All exhaust fans shall be equipped with bird screen and automatic backdraft dampers unless noted otherwise.
3. Fan motors shall be of the 40 degrees Celsius ambient temperature rise type and shall be suitable for continuous duty operation.

G. CEILING MOUNTED EXHAUST FANS

1. The fan housing shall be constructed of heavy gauge galvanized steel. The housing interior shall be lined with 1/2 inch thick acoustical insulation. The discharge duct connection shall be adaptable to horizontal or vertical positions. The access for wiring shall be external. The motor disconnect shall be internal and of the plug in type. The motor shall be mounted on vibration isolators. The fan shall have a forward curved centrifugal wheel(s). All fans shall be licensed to bear the AMCA seal for air and sound performance.
2. Unless noted otherwise fans shall be furnished with integral grille and backdraft damper.
3. The fans shall be Greenheck Model SP, Acme V-Series, Loren-Cook Gemini Series, Broan or equal.

H. RELIEF AND INTAKE HOODS

1. Furnish and install roof hoods as shown. Hood construction shall be of heavy duty aluminum (galvanized) sheets with rolled interlocking seams for reinforcement. Units shall have galvanized steel hood support members for rigidity. The units shall have 1/2 inch x 1/2 inch galvanized bird screen (insect screen, 1 or 2 inch cleanable aluminum filters). Units with throat dimensions of 36 inches x 48 inches or less shall have hinged hoods to allow for easy access to dampers and ductwork. Units with throat dimensions of 36 inches x 48 inches or less shall be shipped assembled and have dampers where specified mounted in throat.
2. Bases shall be heavy gauge aluminum construction 12 inches high.
3. Relief hoods shall have 1 to 1 perimeter area to throat area ratio. Intake hoods shall have 2 to 1 perimeter to throat area ratio.

4. Roof hoods shall be Greenheck Fabra-Hood series, Metalaire, ACME, Loren-Cook or equal.

III. EXECUTION

A. INSTALLATION

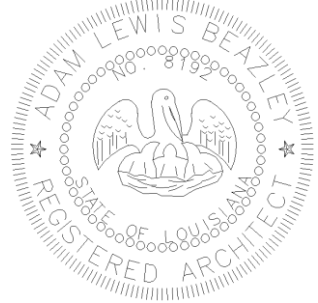
1. Install air conditioning systems in accordance with Section 23 05 00.
2. Mount equipment on pads, complete with piping system, install air unit complete with air distribution system, and provide for power connection.
3. Complete structural, mechanical, and electrical connections in accordance with manufacturer's installation instructions.

B. TESTING

1. Refrigerant lines shall be tested under 200 psi carbon dioxide pressure for five hours using soap suds at joints to test for leaks. Evacuate system and charge with refrigerant.
2. All line testing shall be witnessed by the Test and Balance Agency (TAB). TAB Agency shall record results and include in final TAB report.

END OF SECTION 23 70 00

SECTION 32 13 13 - CONCRETE PAVING



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. Parking area modifications.
2. Curbs.
3. Walks.

B. Related Sections:

1. Section 03 30 00 "Cast-in-Place Concrete" for general building applications of concrete.
2. Section 07 92 00 "Joint Sealants" for joint sealants in expansion and contraction joints within concrete paving and in joints between concrete paving and asphalt paving or adjacent construction.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

B. Other Action Submittals:

1. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates: For the following, from manufacturer:

1. Cementitious materials.
2. Steel reinforcement and reinforcement accessories.
3. Admixtures.
4. Curing compounds.
5. Joint fillers.

B. Material Test Reports: For each of the following:

1. Aggregates. Include service-record data indicating absence of deleterious expansion of concrete due to alkali-aggregate reactivity.

1.5 QUALITY ASSURANCE

- A. ACI Publications: Comply with ACI 301 (ACI 301M) unless otherwise indicated.

1.6 PROJECT CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.
- B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 55 deg F (12.8 deg C) for water-based materials, and not exceeding 95 deg F (35 deg C).

PART 2 - PRODUCTS

2.1 FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.
 - 1. Use flexible or uniformly curved forms for curves with a radius of 100 feet (30.5 m) or less.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.2 STEEL REINFORCEMENT

- A. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from as-drawn steel wire into flat sheets.
- B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420); deformed.
- C. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420) plain-steel bars. Cut bars true to length with ends square and free of burrs.
- D. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified, and as follows:
 - 1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.

2.3 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:

- B. Normal-Weight Aggregates: ASTM C 33, course aggregate or better, uniformly graded. Provide aggregates from a single source with documented service-record data of at least ten (10) years' satisfactory service in similar paving applications and service conditions using similar aggregates and cementitious materials.
 - 1. Maximum Coarse-Aggregate Size: 1 inch (25 mm) nominal.
 - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: Potable and complying with ASTM C 94/C 94M.
- D. Air-Entraining Admixture: ASTM C 260.
- E. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
 - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
 - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.4 CURING MATERIALS

- A. Water: Potable.
- B. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.
- C. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
- D. White, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 2, Class B, dissipating.

2.5 RELATED MATERIALS

- A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber in preformed strips.

2.6 PAVEMENT MARKINGS

- A. Pavement-Marking Paint: Latex, waterborne emulsion, lead and chromate free, ready mixed, complying with FS TT-P-1952, Type II, with drying time of less than forty-five (45) minutes.
 - 1. Color: Yellow.
 - 2. Color at Handicap Parking: Blue.

2.7 WHEEL STOPS

- A. Wheel Stops: Precast, air-entrained concrete, 2500-psi (17.2-MPa) minimum compressive strength, 4-1/2 inches (115 mm) high by 9 inches (225 mm) wide by 72 inches (1820 mm) long.

Provide chamfered corners and drainage slots on underside and holes for anchoring to substrate.

1. Dowels: Galvanized steel, 3/4 inch (19 mm) in diameter, 10 inch (254 mm) minimum length.

2.8 CONCRETE MIXTURES

- A. Prepare design mixtures, proportioned according to ACI 301 (ACI 301M), for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.
 1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
 2. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that meet or exceed requirements.
- B. Proportion mixtures to provide normal-weight concrete with the following properties:
 1. Compressive Strength (Twenty-eight (28) Days): 4000 psi (27.6 MPa).
 2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45.
 3. Slump Limit: 7 inches (178 mm), plus or minus 1 inch (25 mm).
- C. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
 1. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

2.9 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M. Furnish batch certificates for each batch discharged and used in the Work.
 1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from one and one-half (1-1/2) hours to seventy-five (75) minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to sixty (60) minutes.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding.
 1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph (5 km/h).

2. Proof-roll with a pneumatic-tired and loaded, ten (10)-wheel, tandem-axle dump truck weighing not less than 15 tons (13.6 tonnes).
 3. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch (13 mm) according to requirements in provided Geotechnical Report.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of Work and so forms can remain in place at least twenty-four (24) hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.
- D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.5 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half (1/2) hour unless paving terminates at isolation joints.
1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.
 2. Provide tie bars at sides of paving strips where indicated.
 3. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys unless otherwise indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.

4. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
- C. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth (1/4) of the concrete thickness, as follows, to match jointing of existing adjacent concrete paving:
 1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8 inch (3 mm) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
 - a. Tolerance: Ensure that sawed joints are within 3 inches (75 mm) either way from centers of dowels.
- D. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4 inch (6 mm) radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast-in.
- B. Remove snow, ice, or frost from subbase surface and steel reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- D. Comply with ACI 301 (ACI 301M) requirements for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.
- F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- G. Consolidate concrete according to ACI 301 (ACI 301M) by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement joint devices.
- H. Screed paving surface with a straightedge and strike off.
- I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

- J. Curbs and Gutters: Use design mixture for automatic machine placement. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing.
- K. Slip-Form Paving: Use design mixture for automatic machine placement. Produce paving to required thickness, lines, grades, finish, and jointing.
 - 1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of slip-form paving machine during operations.
- L. Cold-Weather Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:
 - 1. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
 - 2. Do not use frozen materials or materials containing ice or snow.
 - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.
- M. Hot-Weather Placement: Comply with ACI 301 (ACI 301M) and as follows when hot-weather conditions exist:
 - 1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 - 3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.7 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
 - 1. Burlap Finish: Drag a seamless strip of damp burlap across float-finished concrete, perpendicular to line of traffic, to provide a uniform, gritty texture.
 - a. For use on walks.
 - 2. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.
 - a. For use on Parking Areas.

3.8 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. by h (1 kg/sq. m by h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by moisture curing, curing compound, or a combination of these as follows:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven (7) days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12 inch (300 mm) lap over adjacent absorptive covers.
 - 2. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas that have been subjected to heavy rainfall within three (3) hours after initial application. Maintain continuity of coating, and repair damage during curing period.

3.9 PAVING TOLERANCES

- A. Comply with tolerances in ACI 117 and as follows:
 - 1. Elevation: 3/4 inch.
 - 2. Thickness: Plus 3/8 inch, minus 1/4 inch.
 - 3. Surface: Gap below 10 foot long, unleveled straightedge not to exceed 1/2 inch.
 - 4. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: 1/2 inch per 12 inches of tie bar.
 - 5. Lateral Alignment and Spacing of Dowels: 1 inch.
 - 6. Vertical Alignment of Dowels: 1/4 inch.
 - 7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches of dowel.
 - 8. Joint Spacing: 3 inches.
 - 9. Contraction Joint Depth: Plus 1/4 inch, no minus.
 - 10. Joint Width: Plus 1/8 inch, no minus.

3.10 PAVEMENT MARKING

- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.
- B. Allow concrete paving to cure for a minimum of twenty-eight (28) days or longer if recommended by the paint manufacturer and be dry before starting pavement marking.

- C. Sweep and clean surface to eliminate loose material and dust.
- D. Apply paint with mechanical equipment to produce markings of dimensions indicated with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.
 - 1. Apply graphic symbols and lettering with paint-resistant, die-cut stencils, firmly secured to concrete surface. Mask an extended area beyond edges of each stencil to prevent paint application beyond stencil. Apply paint so that it cannot run beneath stencil.

3.11 WHEEL STOPS

- A. Install wheel stops in bed of adhesive applied as recommended by manufacturer.
- B. Securely attach wheel stops to paving with not less than two (2) steel dowels located at one-quarter ($1/4$) to one-third ($1/3$) points. Install dowels in drilled holes in the paving and bond dowels to wheel stop. Recess head of dowel beneath top of wheel stop.
 - 1. Seal top of dowels with traffic sealant.

3.12 REPAIRS AND PROTECTION

- A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.
- B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with Portland cement concrete bonded to paving with epoxy adhesive.
- C. Protect concrete paving from damage. Exclude traffic from paving for at least fourteen (14) days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two (2) days before date scheduled for Substantial Completion inspections.

END OF SECTION 32 13 13