

# PROJECT MANUAL

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For the Construction of:

## A New Maintenance Building for Rigby Pioneer Cemetery Rigby, Idaho

February 2018

Set No.



990 John Adams Parkway, P.O. Box 2212, Idaho Falls, Idaho 83403-2212  
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Project Manual  
for  
New Maintenance Building  
Rigby Pioneer Cemetery  
Rigby, Idaho  
February 2018  
Architect's Project No. 15023

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ARCHITECTS:

NBW Architects, P.A.  
990 John Adams Parkway  
P.O. Box 2212  
Idaho Falls, Idaho 83403  
Telephone: (208) 522-8779  
Fax: (208) 522-8785

STRUCTURAL CONSULTANT:

G & S Structural Engineers  
505 Lindsay Boulevard  
Idaho Falls, Idaho 83402  
Telephone: (208) 523-6918  
Fax: (208) 523-6922

MECHANICAL CONSULTANT:

Engineered Systems Associates, Inc.  
1355 East Center Street  
Pocatello, Idaho 83201  
Telephone: (208) 233-0501  
Fax: (208) 233-0529

ELECTRICAL CONSULTANT:

Payne Engineering, Inc.  
1823 East Center Street  
Pocatello, Idaho 83201  
Telephone: (208) 232-4439  
Fax: (208) 232-1435





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**DOCUMENT 00 0115 - LIST OF DRAWING SHEETS**

**1.1 LIST OF DRAWINGS**

- A. Drawings: Drawings consist of the Contract Drawings and other drawings listed on the Table of Contents page of the separately bound drawing set titled Maintenance Building for Rigby Pioneer Cemetery, Rigby, Idaho, dated October 2017, as modified by subsequent Addenda and Contract modifications.

**END OF DOCUMENT 00 0115**

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# PROCUREMENT AND CONTRACTING REQUIREMENTS

## **DOCUMENT 00 1113 - ADVERTISEMENT FOR BIDS**

### **1.1 PROJECT INFORMATION**

- A. Notice to Bidders: Qualified bidders may submit bids for project as described in this Document. Submit bids according to the Instructions to Bidders.
  - 1. Regulatory Requirements: Idaho Public Works rules shall govern submittal, opening, and award of bids.
- B. Project Identification: Rigby Pioneer Cemetery – Maintenance Building
  - 1. Project Location: 4033 East 300 North, Rigby, Idaho 83442.
- C. Owner: Rigby Pioneer Cemetery District, 4084 East 450 North, Rigby, Idaho 83442.
  - 1. Owner's Representative: Randy Rolfe, telephone (208) 745-6345.
- D. Architect: NBW Architects, P.A., 990 John Adams Parkway, P.O. Box 2212, Idaho Falls, Idaho 83403, Telephone: 208-522-8779. Fax: 208-522-878.
- E. Project Description: Project consists of New wood frame building including associated site work, plumbing, HVAC and electrical work.
  - 1. Project cost range is anticipated to be under \$200,000.00.
- F. Construction Contract: Bids will be received for the following Work:
  - 1. General Contract (all trades).

### **1.2 BID SUBMITTAL AND OPENING**

- A. Owner will receive sealed lump sum bids until the bid time and date at the location given below. Owner will consider bids prepared in compliance with the Instructions to Bidders issued by Owner, and delivered as follows:
  - 1. Bid Date: March 20, 2018.
  - 2. Bid Time: 2:00 p.m., local time.
  - 3. Location: NBW Architects, P.A., 990 John Adams Parkway, Idaho Falls, Idaho 83403.
- B. Bids will be thereafter publicly opened and read aloud.

### **1.3 BID SECURITY**

- A. Bid security shall be submitted with each bid in the amount of 5 percent of the bid amount. No bids may be withdrawn for a period of 30 days after opening of bids. Owner reserves the right to reject any and all bids and to waive informalities and irregularities.

### **1.4 PREBID MEETING**

- A. Prebid Meeting: A Prebid meeting for all bidders will be held at NBW Architects, P.A., 990 John Adams Parkway, Idaho Falls, Idaho on March 1, 2018 at 2:00 p.m., local time. Prospective prime bidders are requested to attend.

### **1.5 DOCUMENTS**

- A. Electronic documents will be issued in PDF format to each prime bidder.
- B. Printed Procurement and Contracting Documents: One set may be obtained by contacting Architect. Documents will be provided to prime bidders only upon request; only complete sets of documents will be issued.
  - 1. Deposit: \$50.00 made payable to Architect.
  - 2. Shipping: Additional shipping charges will apply.
- C. Online Procurement and Contracting Documents: Obtain access by contacting Architect. Online access will be provided to all bidders and suppliers.
- D. Viewing Procurement and Contracting Documents: Examine at the locations below:



1. Idaho AGC: [www.idahoagc.org](http://www.idahoagc.org).
2. Mountain Lands Area Plan Room: [www.mountainlandsareaplanroom.com](http://www.mountainlandsareaplanroom.com).
3. Architect's office.

**1.6 TIME OF COMPLETION**

- A. Successful bidder shall begin the Work on receipt of the Notice to Proceed and shall complete the Work within the Contract Time.

**1.7 BIDDER'S QUALIFICATIONS**

- A. Bidders must be properly licensed under the laws governing their respective trades and be able to obtain insurance and bonds required for the Work. A Performance Bond, separate Labor and Material Payment Bond, and Insurance in a form acceptable to Owner will be required of the successful Bidder.

**1.8 NOTIFICATION**

- A. This Advertisement for Bids document is issued by Rigby Pioneer Cemetery District.

**END OF DOCUMENT 00 1113**

## **DOCUMENT 00 2113 - INSTRUCTIONS TO BIDDERS**

### **1.1 INSTRUCTIONS TO BIDDERS**

- A. AIA Document A701, "Instructions to Bidders," is hereby incorporated into the Procurement and Contracting Requirements by reference.
  - 1. A copy of AIA Document A701, "Instructions to Bidders," is bound in this Project Manual.

**END OF DOCUMENT 00 2113**

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# AIA<sup>®</sup> Document A701<sup>™</sup> – 1997

## Instructions to Bidders

for the following PROJECT:

(Name and location or address):

### THE OWNER:

(Paragraph deleted)

(Name and address):

### THE ARCHITECT:

(Name and address):

NBW Architects, P.A.  
990 John Adams Parkway  
P.O. Box 2212  
Idaho Falls, Idaho 83403

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### ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

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

## **ARTICLE 1 DEFINITIONS**

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

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

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

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

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

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

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

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

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

## **ARTICLE 2 BIDDER'S REPRESENTATIONS**

§ 2.1 The Bidder by making a Bid represents that:

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

§ 2.1.2 The Bid is made in compliance with the Bidding Documents.

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

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

## **ARTICLE 3 BIDDING DOCUMENTS**

### **§ 3.1 COPIES**

§ 3.1.1 Bidders may obtain complete sets of the Bidding Documents from the issuing office designated in the Advertisement or Invitation to Bid in the number and for the deposit sum, if any, stated therein. The deposit will be refunded to Bidders who submit a bona fide Bid and return the Bidding Documents in good condition within ten days after receipt of Bids. The cost of replacement of missing or damaged documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the Bidding Documents and the Bidder's deposit will be refunded.

§ 3.1.2 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the Advertisement or Invitation to Bid, or in supplementary instructions to bidders.

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

§ 3.1.4 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

§ 3.2.1 The Bidder shall carefully study and compare the Bidding Documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.

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

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

### § 3.3 SUBSTITUTIONS

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

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

§ 3.3.3 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.

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

### § 3.4 ADDENDA

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

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

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

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

## ARTICLE 4 BIDDING PROCEDURES

### § 4.1 PREPARATION OF BIDS

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

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

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

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

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

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

§ 4.1.7 Each copy of the Bid shall state the legal name 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.

## § 4.2 BID SECURITY

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

§ 4.2.2 If a surety bond is required, it shall be written on AIA Document A310, Bid Bond, unless otherwise provided in the Bidding Documents, and the attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the power of attorney.

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

## § 4.3 SUBMISSION OF BIDS

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

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

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

§ 4.3.4 Oral, telephonic, telegraphic, facsimile or other electronically transmitted bids will not be considered.

## § 4.4 MODIFICATION OR WITHDRAWAL OF BID

§ 4.4.1 A Bid may not be modified, withdrawn or canceled by the Bidder during the stipulated time period following the time and date designated for the receipt of Bids, and each Bidder so agrees in submitting a Bid.

§ 4.4.2 Prior to the time and date designated for receipt of Bids, a Bid submitted may be modified or withdrawn by notice to the party receiving Bids at the place 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.

§ 4.4.3 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids provided that they are then fully in conformance with these Instructions to Bidders.

§ 4.4.4 Bid security, if required, shall be in an amount sufficient for the Bid as resubmitted.

## **ARTICLE 5 CONSIDERATION OF BIDS**

### **§ 5.1 OPENING OF BIDS**

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

### **§ 5.2 REJECTION OF BIDS**

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)**

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

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

## **ARTICLE 6 POST-BID INFORMATION**

### **§ 6.1 CONTRACTOR'S QUALIFICATION STATEMENT**

Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request, a properly executed AIA Document A305, 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 CAPABILITY**

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

### **§ 6.3 SUBMITTALS**

§ 6.3.1 The Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, after notification of selection for the award of a Contract, furnish to the Owner through the Architect in writing:

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

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

§ 6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder in writing if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, (1) withdraw the Bid or (2) submit an acceptable substitute person or entity with an adjustment in the Base Bid or



Alternate Bid to cover the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

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

## **ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND**

### **§ 7.1 BOND REQUIREMENTS**

§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Bonds may be secured through the Bidder's usual sources.

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

§ 7.1.3 If the Owner requires that bonds be secured from other than the Bidder's usual sources, changes in cost will be adjusted as provided in the Contract Documents.

### **§ 7.2 TIME OF DELIVERY AND FORM OF BONDS**

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

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond. Both bonds shall be written in the amount of the Contract Sum.

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

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

## **ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR**

Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on AIA Document A101, Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment Is a Stipulated Sum.

## **DOCUMENT 00 2215 – SUPPLEMENTARY INSTRUCTIONS TO BIDDERS**

The following supplements modify, change, delete, or add to the "Instructions to Bidders", AIA Document A701, 1997. Where any part of the Instructions to Bidders is modified or voided by these Articles, the undeleted provisions of that part shall remain in effect.

### **ARTICLE 3: BIDDING DOCUMENTS**

#### 3.1 COPIES

- 3.1.2 Delete the entire subparagraph and substitute the following: "Bidding Documents may be issued to major Sub-bidders or others at the discretion of the Architect on a first come first serve basis.

#### 3.3 SUBSTITUTIONS

- 3.3.2 In the second line change the word "ten" to "seven".

### **ARTICLE 4: BIDDING PROCEDURES**

#### 4.2 BID SECURITY

- 4.2.1.1 No proposal will be considered unless accompanied by a deposit in the amount of five percent (5%) of the total bid, either by a Bid Bond, certified or cashier's check made payable to the Owner.
- 4.2.2 In the first line following the word "Bond," add "or other approved form,".

### **ARTICLE 5: CONSIDERATION OF BIDS**

#### 5.1 OPENING OF BIDS

- 5.1.1 Sealed Bids for performing the work contemplated by this contract will be received at the date, time and place indicated in the advertisement for bids.

#### 5.3 ACCEPTANCE OF BID (AWARD)

- 5.3.3 The Bidder to whom the award is made will be promptly notified and within seven (7) calendar days. From the date of such notification, he shall execute the contract agreement in triplicate, furnish contract bond and insurance certification.

### **ARTICLE 9: PROJECT INFORMATION**

#### 9.1 THE WORK

- 9.1.1 Rigby Pioneer Cemetery - Maintenance Building  
4085 East 450 North  
Rigby, Idaho 83442

#### 9.2 THE OWNER

- 9.2.1 Rigby Pioneer Cemetery  
4085 East 450 North  
Rigby, Idaho 83442

#### 9.3 THE ARCHITECT

- 9.3.1 NBW Architects, P.A.  
990 John Adams Parkway  
P.O. Box 2212  
Idaho Falls, Idaho 83403

## **ARTICLE 10: ARRANGEMENT OF CONTRACTS**

### **10.1 PROPOSALS**

- 10.1.1 The proposed work will be bid and awarded under one contract covering only those divisions and work stipulated in the construction Documents.
- 10.1.2 Proposals must be for the complete Work and no separate proposals will be received on portions of the Work.

## **ARTICLE 11: CONSTRUCTION TIME AND LIQUIDATED DAMAGES**

### **11.2 TIME OF COMPLETION**

- 11.2.1 Time is hereby expressly declared to be of the essence of the contract. The successful bidder will be expected to gear his operations and organize his work and subcontract to complete this project in the earliest possible time. The Owner acknowledges that the Contractor is not able to control the weather; however, the Contractor shall be otherwise required to take all necessary steps to furnish adequate labor to complete the project as soon as possible. He shall be responsible for any and all damages incurred by the Owner by reason of delays necessitated by his failure or failure of the Subcontractors to diligently act to secure necessary materials and labor for the completion of this project in a reasonable time, which we have calculated to be 120 calendar days after receiving notice to proceed with actual construction.

**END OF DOCUMENT 00 2215**

## **DOCUMENT 00 2600 - PROCUREMENT SUBSTITUTION PROCEDURES**

### **1.1 DEFINITIONS**

- A. Procurement Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Procurement and Contracting Documents, submitted prior to receipt of bids.
- B. Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Contract Documents, submitted following Contract award. See Section 01 2500 "Substitution Procedures" for conditions under which Substitution requests will be considered following Contract award.

### **1.2 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.

### **1.3 PROCUREMENT SUBSTITUTIONS**

- A. Procurement Substitutions, General: By submitting a bid, the Bidder represents that its bid is based on materials and equipment described in the Procurement and Contracting Documents, including Addenda. Bidders are encouraged to request approval of qualifying substitute materials and equipment when the Specifications Sections list materials and equipment by product or manufacturer name.
- B. Procurement Substitution Requests will be received and considered by Owner when the following conditions are satisfied, as determined by Architect; otherwise requests will be returned without action:
  - 1. Extensive revisions to the Contract Documents are not required.
  - 2. Proposed changes are in keeping with the general intent of the Contract Documents, including the level of quality of the Work represented by the requirements therein.
  - 3. The request is fully documented and properly submitted.

### **1.4 SUBMITTALS**

- A. Procurement Substitution Request: Submit to Architect. Procurement Substitution Request must be made in writing by prime contract Bidder only in compliance with the following requirements:
  - 1. Requests for substitution of materials and equipment will be considered if received no later than 10 days prior to date of bid opening.
  - 2. Submittal Format: Submit three copies of each written Procurement Substitution Request, using CSI Substitution Request Form 1.5C.
  - 3. Submittal Format: Submit Procurement Substitution Request, using format provided on Project Web site.
    - a. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specifications Sections and drawing numbers.
    - b. Provide complete documentation on both the product specified and the proposed substitute, including the following information as appropriate:
      - 1) Point-by-point comparison of specified and proposed substitute product data, fabrication drawings, and installation procedures.
      - 2) Copies of current, independent third-party test data of salient product or system characteristics.
      - 3) Samples where applicable or when requested by Architect.
      - 4) Detailed comparison of significant qualities of the proposed substitute with those of the Work specified. 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.
      - 5) Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
      - 6) Research reports, where applicable, evidencing compliance with building code in effect for Project, from ICC-ES.
      - 7) Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, which will become necessary to accommodate the proposed substitute.

- c. Provide certification by manufacturer that the substitute proposed is equal to or superior to that required by the Procurement and Contracting Documents, and that its in-place performance will be equal to or superior to the product or equipment specified in the application indicated.
  - d. Bidder, in submitting the Procurement Substitution Request, waives the right to additional payment or an extension of Contract Time because of the failure of the substitute to perform as represented in the Procurement Substitution Request.
- B. Architect's Action:
  - 1. Architect may request additional information or documentation necessary for evaluation of the Procurement Substitution Request. Architect will notify all bidders of acceptance of the proposed substitute by means of an Addendum to the Procurement and Contracting Documents.
- C. Architect's approval of a substitute during bidding does not relieve Contractor of the responsibility to submit required shop drawings and to comply with all other requirements of the Contract Documents.

**END OF DOCUMENT 00 2600**

**DOCUMENT 00 4113 - BID FORM - STIPULATED SUM (SINGLE-PRIME CONTRACT)**

**1.1 BID INFORMATION**

- A. Bidder:
- B. Project Name: Rigby Pioneer Cemetery – Maintenance Building
- C. Project Location: 4085 East 450 North, Rigby, Idaho.
- D. Owner: Rigby Pioneer Cemetery, 4085 East 450 North, Rigby, Idaho 83442.
- E. Architect: NBW Architects, P.A., 990 John Adams Parkway, P.O. Box 2212, Idaho Falls, Idaho 83403. Telephone: 208-522-8779. Fax: 208-522-878.

**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 NBW Architects, P.A. 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 Procurement and Contracting Documents, for the stipulated sum of:

1. \_\_\_\_\_ Dollars (\$\_\_\_\_\_).

**1.3 BID GUARANTEE**

- A. The undersigned Bidder agrees to execute a contract for this Work in the above amount, if offered within 30 days after receipt of bids, and on failure to do so agrees to forfeit to Owner the attached cash, cashier's check, certified check, U.S. money order, or bid bond, as liquidated damages for such failure, in the amount constituting five percent (5%) of the Base Bid amount above.
- B. In the event Owner does not offer Notice of Award within the time limits stated above, Owner will return to the undersigned the cash, cashier's check, certified check, U.S. money order, or bid bond.

**1.4 SUBCONTRACTORS AND SUPPLIERS**

- A. The following companies will perform the indicated portions of the Work if the undersigned bidder is awarded the Contract:
  - 1. Plumbing Work (Name): \_\_\_\_\_  
(Address): \_\_\_\_\_  
Idaho Plumbing Contractor's License No. \_\_\_\_\_
  - 2. HVAC Work (Name): \_\_\_\_\_  
(Address): \_\_\_\_\_  
Idaho Contractor's License No. \_\_\_\_\_
  - 3. Electrical Work (Name): \_\_\_\_\_  
(Address): \_\_\_\_\_  
Idaho Electrical Contractor's License No. \_\_\_\_\_

**1.5 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 substantially complete the Work within 120 calendar days.

**1.6 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. \_\_, dated \_\_\_\_\_.
  2. Addendum No. \_\_, dated \_\_\_\_\_.
  3. Addendum No. \_\_, dated \_\_\_\_\_.
  4. Addendum No. \_\_, dated \_\_\_\_\_.

**1.7 CONTRACTOR'S LICENSE**

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

**1.8 SUBMISSION OF BID**

Respectfully submitted this \_\_\_\_ day of \_\_\_\_\_, 2017.

Submitted By: \_\_\_\_\_  
(Name of bidding firm or corporation)

Authorized Signature: \_\_\_\_\_  
(Handwritten signature)

Signed By: \_\_\_\_\_  
(Type or print name)

Title: \_\_\_\_\_  
(Owner/Partner/President/Vice President)

Street Address: \_\_\_\_\_

City, State, Zip \_\_\_\_\_

Phone: \_\_\_\_\_

License No.: \_\_\_\_\_

Federal ID No.: \_\_\_\_\_

(Affix Corporate Seal Here)

**END OF DOCUMENT 00 4113**

## **DOCUMENT 00 4373 - PROPOSED SCHEDULE OF VALUES FORM**

### **1.1 BID FORM SUPPLEMENT**

- A. A completed Proposed Schedule of Values form is required to be submitted to the Architect within 10 days of the bid opening.

### **1.2 PROPOSED SCHEDULE OF VALUES FORM**

- A. Proposed Schedule of Values Form: Provide a breakdown of the bid amount, including alternates, in enough detail to facilitate continued evaluation of bid. Coordinate with the Project Manual table of contents. Provide multiple line items for principal material and subcontract amounts in excess of five percent of the Contract Sum.
- B. Arrange schedule of values consistent with format of AIA Document G703.
  - 1. Copies of AIA standard forms may be obtained from the American Institute of Architects; <http://www.aia.org/contractdocs/purchase/index.htm>; [docspurchases@aia.org](mailto:docspurchases@aia.org); (800) 942-7732.

**END OF DOCUMENT 00 4373**



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## **DOCUMENT 00 4393 - BID SUBMITTAL CHECKLIST**

### **1.1 BID INFORMATION**

- A. Bidder:
- B. Project Name: Rigby Pioneer Cemetery – Maintenance Building.
- C. Project Location: 4085 East 450 North, Rigby, Idaho.
- D. Owner: Rigby Pioneer Cemetery, 4085 East 450 North, Rigby, Idaho 83442.
- E. Architect: NBW Architects, P.A., 990 John Adams Parkway, P.O. Box 2212, Idaho Falls, Idaho 83403.
- F. Architect Project Number: 15023.

### **1.2 BIDDER'S CHECKLIST**

- A. In an effort to assist the Bidder in properly completing all documentation required, the following checklist is provided for the Bidder's convenience. The Bidder is solely responsible for verifying compliance with bid submittal requirements.
- B. Attach this completed checklist to the outside of the Submittal envelope.
  - 1. Used the Bid Form provided in the Project Manual.
  - 2. Prepared the Bid Form as required by the Instructions to Bidders.
  - 3. Indicated on the Bid Form the Addenda received.
  - 4. Include Bid Security in Bid envelope.
  - 5. Bid envelope shows name and address of the Bidder.
  - 6. Bid envelope shows name of Project being bid.
  - 7. Verified that the Bidder can provide Certificates of Insurance in the amounts indicated.

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## **DOCUMENT 00 6000 - PROJECT FORMS**

### **1.1 FORM OF AGREEMENT AND GENERAL CONDITIONS**

- A. The following form of Owner/Contractor Agreement and form of the General Conditions shall be used for Project:
  - 1. AIA Document A105-2017, "Standard Short Form of Agreement between Owner and Contractor."
  - 2. The General Conditions are included in the Agreement form.
  - 3. The Supplementary Conditions for Project are separately prepared and included in the Project Manual.

### **1.2 ADMINISTRATIVE FORMS**

- A. Administrative Forms: Additional administrative forms are specified in Division 01 General Requirements.
- B. Copies of AIA standard forms may be obtained from the American Institute of Architects; <http://www.aia.org/contractdocs/purchase/index.htm>; [docspurchases@aia.org](mailto:docspurchases@aia.org); (800) 942-7732.
- C. Preconstruction Forms:
  - 1. Form of Performance Bond and Labor and Material Bond: AIA Document A312-2010 "Performance Bond and Payment Bond."
  - 2. Form of Certificate of Insurance: AIA Document G715, "Supplemental Attachment for ACORD Certificate of Insurance 25-S."
- D. Information and Modification Forms:
  - 1. Form for Requests for Information (RFIs): AIA Document G716, "Request for Information (RFI)" or acceptable Contractor's form
  - 2. Form of Request for Proposal: AIA Document G709, "Work Changes Proposal Request" or acceptable Contractor's form.
  - 3. Change Order Form: AIA Document G701, "Change Order" or Architect's standard form.
- E. Payment Forms:
  - 1. Schedule of Values Form: AIA Document G703, "Continuation Sheet."
  - 2. Payment Application: AIA Document G702/703, "Application and Certificate for Payment and Continuation Sheet."

**END OF DOCUMENT 00 6000**

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# AIA<sup>®</sup> Document A105<sup>™</sup> – 2017

## Standard Short Form of Agreement Between Owner and Contractor

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

BETWEEN the Owner:

(Name, legal status, address and other information)

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

and the Contractor:

(Name, legal status, address and other information)

for the following Project:

(Name, location and detailed description)

The Architect:

(Name, legal status, address and other information)

The Owner and Contractor agree as follows.

Init.

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### ARTICLE 1 THE CONTRACT DOCUMENTS

The Contractor shall complete the Work described in the Contract Documents for the Project. The Contract Documents consist of

- .1 this Agreement signed by the Owner and Contractor;
- .2 the drawings and specifications prepared by the Architect, dated \_\_\_\_\_, and enumerated as follows:

Drawings:  
Number

Title

Date

Specifications:  
Section

Title

Pages

.3 addenda prepared by the Architect as follows:

Number

Date

Pages

.4 written orders for changes in the Work, pursuant to Article 10, issued after execution of this Agreement; and

.5 other documents, if any, identified as follows:

## ARTICLE 2 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 2.1 The Contract Time is the number of calendar days available to the Contractor to substantially complete the Work.

### § 2.2 Date of Commencement:

Unless otherwise set forth below, the date of commencement shall be the date of this Agreement.

*(Insert the date of commencement if other than the date of this Agreement.)*

### § 2.3 Substantial Completion:

Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion, as defined in Section 12.5, of the entire Work:

*(Check the appropriate box and complete the necessary information.)*

☐ Not later than ( ) calendar days from the date of commencement.

☐ By the following date:

## ARTICLE 3 CONTRACT SUM

§ 3.1 The Contract Sum shall include all items and services necessary for the proper execution and completion of the Work. Subject to additions and deductions in accordance with Article 10, the Contract Sum is: (\$ )

§ 3.2 For purposes of payment, the Contract Sum includes the following values related to portions of the Work:

*(Itemize the Contract Sum among the major portions of the Work.)*

Portion of the Work

Value

§ 3.3 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and hereby accepted by the Owner:

*(Identify the accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)*



§ 3.4 Allowances, if any, included in the Contract Sum are as follows:  
(Identify each allowance.)

Item	Price
------	-------

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

Item	Units and Limitations	Price per Unit (\$0.00)
------	-----------------------	-------------------------

#### ARTICLE 4 PAYMENTS

§ 4.1 Based on Contractor's Applications for Payment certified by the Architect, the Owner shall pay the Contractor, in accordance with Article 12, as follows:

(Insert below timing for payments and provisions for withholding retainage, if any.)

§ 4.2 Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate below, or in the absence thereof, at the legal rate prevailing at the place of the Project.

(Insert rate of interest agreed upon, if any.)

%

#### ARTICLE 5 INSURANCE

§ 5.1 The Contractor shall maintain the following types and limits of insurance until the expiration of the period for correction of Work as set forth in Section 14.2, subject to the terms and conditions set forth in this Section 5.1:

§ 5.1.1 Commercial General Liability insurance for the Project, written on an occurrence form, with policy limits of not less than (\$ ) each occurrence, (\$ ) general aggregate, and (\$ ) aggregate for products-completed operations hazard.

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

§ 5.1.3 The Contractor may achieve the required limits and coverage for Commercial General Liability and Automobile Liability through a combination of primary and excess or umbrella liability insurance, provided that such primary and excess or umbrella insurance policies result in the same or greater coverage as those required under Section 5.1.1 and 5.1.2, and in no event shall any excess or umbrella liability insurance provide narrower coverage than the primary policy. The excess policy shall not require exhaustion of the underlying limits only through the actual payment by the underlying insurers.

§ 5.1.4 Workers' Compensation at statutory limits.

§ 5.1.5 Employers' Liability with policy limits not less than (\$ ) each accident, (\$ ) each employee, and (\$ ) policy limit.

§ 5.1.6 The Contractor shall provide builder's risk insurance to cover the total value of the entire Project on a replacement cost basis.

**§ 5.1.7 Other Insurance Provided by the Contractor**

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

Coverage

Limits

§ 5.2 The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance and shall provide property insurance to cover the value of the Owner's property. The Contractor is entitled to receive an increase in the Contract Sum equal to the insurance proceeds related to a loss for damage to the Work covered by the Owner's property insurance.

§ 5.3 The Contractor shall obtain an endorsement to its Commercial General Liability insurance policy to provide coverage for the Contractor's obligations under Section 8.12.

§ 5.4 Prior to commencement of the Work, each party shall provide certificates of insurance showing their respective coverages.

§ 5.5 Unless specifically precluded by the Owner's property insurance policy, the Owner and Contractor waive all rights against (1) each other and any of their subcontractors, suppliers, agents, and employees, each of the other; and (2) the Architect, Architect's consultants, and any of their agents and employees, for damages caused by fire or other causes of loss to the extent those losses are covered by property insurance or other insurance applicable to the Project, except such rights as they have to the proceeds of such insurance.

**ARTICLE 6 GENERAL PROVISIONS**

**§ 6.1 The Contract**

The Contract represents the entire and integrated agreement between the parties and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a written modification in accordance with Article 10.

**§ 6.2 The Work**

The term "Work" means the construction and services required by the Contract Documents, and includes all other labor, materials, equipment, and services provided, or to be provided, by the Contractor to fulfill the Contractor's obligations.

**§ 6.3 Intent**

The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all.

**§ 6.4 Ownership and Use of Architect's Drawings, Specifications and Other Documents**

Documents prepared by the Architect are instruments of the Architect's service for use solely with respect to this Project. The Architect shall retain all common law, statutory, and other reserved rights, including the copyright. The Contractor, subcontractors, sub-subcontractors, and suppliers are authorized to use and reproduce the instruments of service solely and exclusively for execution of the Work. The instruments of service may not be used for other Projects or for additions to this Project outside the scope of the Work without the specific written consent of the Architect.



## **§ 6.5 Electronic Notice**

Written notice under this Agreement may be given by one party to the other by email as set forth below.

*(Insert requirements for delivering written notice by email such as name, title, and email address of the recipient, and whether and how the system will be required to generate a read receipt for the transmission.)*

## **ARTICLE 7 OWNER**

### **§ 7.1 Information and Services Required of the Owner**

**§ 7.1.1** If requested by the Contractor, the Owner shall furnish all necessary surveys and a legal description of the site.

**§ 7.1.2** Except for permits and fees under Section 8.7.1 that are the responsibility of the Contractor, the Owner shall obtain and pay for other necessary approvals, easements, assessments, and charges.

**§ 7.1.3** Prior to commencement of the Work, at the written request of the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence.

### **§ 7.2 Owner's Right to Stop the Work**

If the Contractor fails to correct Work which is not in accordance with the Contract Documents, the Owner may direct the Contractor in writing to stop the Work until the correction is made.

### **§ 7.3 Owner's Right to Carry Out the Work**

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a seven day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies, correct such deficiencies. In such case, the Architect may withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the cost of correction, provided the actions of the Owner and amounts charged to the Contractor were approved by the Architect.

### **§ 7.4 Owner's Right to Perform Construction and to Award Separate Contracts**

**§ 7.4.1** The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project.

**§ 7.4.2** The Contractor shall coordinate and cooperate with the Owner's own forces and separate contractors employed by the Owner.

## **ARTICLE 8 CONTRACTOR**

### **§ 8.1 Review of Contract Documents and Field Conditions by Contractor**

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

**§ 8.1.2** The Contractor shall carefully study and compare the Contract Documents with each other and with information furnished by the Owner. Before commencing activities, the Contractor shall (1) take field measurements and verify field conditions; (2) carefully compare this and other information known to the Contractor with the Contract Documents; and (3) promptly report errors, inconsistencies, or omissions discovered to the Architect.

### **§ 8.2 Contractor's Construction Schedule**

The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work.

### **§ 8.3 Supervision and Construction Procedures**

**§ 8.3.1** The Contractor shall supervise and direct the Work using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work.

**§ 8.3.2** The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner, through the Architect, the names of subcontractors or suppliers for each portion of the Work. The Contractor shall not contract with any subcontractor or supplier to whom the Owner or Architect have made a timely and reasonable objection.

#### **§ 8.4 Labor and Materials**

**§ 8.4.1** Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work.

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

#### **§ 8.5 Warranty**

The Contractor warrants to the Owner and Architect that: (1) materials and equipment furnished under the Contract will be new and of good quality unless otherwise required or permitted by the Contract Documents; (2) the Work will be free from defects not inherent in the quality required or permitted; and (3) the Work will conform to the requirements of the Contract Documents. Any material or equipment warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 12.5.

#### **§ 8.6 Taxes**

The Contractor shall pay sales, consumer, use, and similar taxes that are legally required when the Contract is executed.

#### **§ 8.7 Permits, Fees and Notices**

**§ 8.7.1** The Contractor shall obtain and pay for the building permit and other permits and governmental fees, licenses, and inspections necessary for proper execution and completion of the Work.

**§ 8.7.2** The Contractor shall comply with and give notices required by agencies having jurisdiction over the Work. If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume full responsibility for such Work and shall bear the attributable costs. The Contractor shall promptly notify the Architect in writing of any known inconsistencies in the Contract Documents with such governmental laws, rules, and regulations.

#### **§ 8.8 Submittals**

The Contractor shall promptly review, approve in writing, and submit to the Architect shop drawings, product data, samples, and similar submittals required by the Contract Documents. Shop drawings, product data, samples, and similar submittals are not Contract Documents.

#### **§ 8.9 Use of Site**

The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits, the Contract Documents, and the Owner.

#### **§ 8.10 Cutting and Patching**

The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly.

#### **§ 8.11 Cleaning Up**

The Contractor shall keep the premises and surrounding area free from accumulation of debris and trash related to the Work. At the completion of the Work, the Contractor shall remove its tools, construction equipment, machinery, and surplus material; and shall properly dispose of waste materials.

#### **§ 8.12 Indemnification**

To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them, from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a subcontractor, anyone directly or indirectly employed by them or anyone for whose acts



they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder.

## **ARTICLE 9 ARCHITECT**

§ 9.1 The Architect will provide administration of the Contract as described in the Contract Documents. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 9.2 The Architect will visit the site at intervals appropriate to the stage of construction to become generally familiar with the progress and quality of the Work.

§ 9.3 The Architect will not have control over or charge of, and will not be responsible for, construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's responsibility. The Architect will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents.

§ 9.4 Based on the Architect's observations and evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor.

§ 9.5 The Architect has authority to reject Work that does not conform to the Contract Documents.

§ 9.6 The Architect will promptly review and approve or take appropriate action upon Contractor's submittals, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 9.7 On written request from either the Owner or Contractor, the Architect will promptly interpret and decide matters concerning performance under, and requirements of, the Contract Documents.

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

§ 9.9 The Architect's duties, responsibilities, and limits of authority as described in the Contract Documents shall not be changed without written consent of the Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.

## **ARTICLE 10 CHANGES IN THE WORK**

§ 10.1 The Owner, without invalidating the Contract, may order changes in the Work within the general scope of the Contract, consisting of additions, deletions or other revisions, and the Contract Sum and Contract Time shall be adjusted accordingly, in writing. If the Owner and Contractor cannot agree to a change in the Contract Sum, the Owner shall pay the Contractor its actual cost plus reasonable overhead and profit.

§ 10.2 The Architect may authorize or order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. Such authorization or order shall be in writing and shall be binding on the Owner and Contractor. The Contractor shall proceed with such minor changes promptly.

§ 10.3 If concealed or unknown physical conditions are encountered at the site that differ materially from those indicated in the Contract Documents or from those conditions ordinarily found to exist, the Contract Sum and Contract Time shall be subject to equitable adjustment.

## **ARTICLE 11 TIME**

§ 11.1 Time limits stated in the Contract Documents are of the essence of the Contract.

§ 11.2 If the Contractor is delayed at any time in progress of the Work by changes ordered in the Work, or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, or other causes beyond the Contractor's control, the Contract Time shall be subject to equitable adjustment.

§ 11.3 Costs caused by delays or by improperly timed activities or defective construction shall be borne by the responsible party.



## **ARTICLE 12 PAYMENTS AND COMPLETION**

### **§ 12.1 Contract Sum**

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

### **§ 12.2 Applications for Payment**

**§ 12.2.1** At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment for Work completed in accordance with the values stated in this Agreement. The Application shall be supported by data substantiating the Contractor's right to payment as the Owner or Architect may reasonably require, such as evidence of payments made to, and waivers of liens from, subcontractors and suppliers. Payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment stored, and protected from damage, off the site at a location agreed upon in writing.

**§ 12.2.2** The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment, all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or other encumbrances adverse to the Owner's interests.

### **§ 12.3 Certificates for Payment**

The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in part; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole. If certification or notification is not made within such seven day period, the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time and the Contract Sum shall be equitably adjusted due to the delay.

### **§ 12.4 Progress Payments**

**§ 12.4.1** After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner provided in the Contract Documents.

**§ 12.4.2** The Contractor shall promptly pay each subcontractor and supplier, upon receipt of payment from the Owner, an amount determined in accordance with the terms of the applicable subcontracts and purchase orders.

**§ 12.4.3** Neither the Owner nor the Architect shall have responsibility for payments to a subcontractor or supplier.

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

### **§ 12.5 Substantial Completion**

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

**§ 12.5.2** When the Contractor believes that the Work or designated portion thereof is substantially complete, it will notify the Architect and the Architect will make an inspection to determine whether the Work is substantially complete. When the Architect determines that the Work is substantially complete, the Architect shall prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, establish the responsibilities of the Owner and Contractor, and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

## **§ 12.6 Final Completion and Final Payment**

**§ 12.6.1** Upon receipt of a final Application for Payment, the Architect will inspect the Work. When the Architect finds the Work acceptable and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment.

**§ 12.6.2** Final payment shall not become due until the Contractor submits to the Architect releases and waivers of liens, and data establishing payment or satisfaction of obligations, such as receipts, claims, security interests, or encumbrances arising out of the Contract.

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

## **ARTICLE 13 PROTECTION OF PERSONS AND PROPERTY**

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs, including all those required by law in connection with performance of the Contract. The Contractor shall take reasonable precautions to prevent damage, injury, or loss to employees on the Work and other persons who may be affected thereby, the Work and materials and equipment to be incorporated therein, and other property at the site or adjacent thereto. The Contractor shall promptly remedy damage and loss to property caused in whole or in part by the Contractor, or by anyone for whose acts the Contractor may be liable.

## **ARTICLE 14 CORRECTION OF WORK**

**§ 14.1** The Contractor shall promptly correct Work rejected by the Architect as failing to conform to the requirements of the Contract Documents. The Contractor shall bear the cost of correcting such rejected Work, including the costs of uncovering, replacement, and additional testing.

**§ 14.2** In addition to the Contractor's other obligations including warranties under the Contract, the Contractor shall, for a period of one year after Substantial Completion, correct work not conforming to the requirements of the Contract Documents.

**§ 14.3** If the Contractor fails to correct nonconforming Work within a reasonable time, the Owner may correct it in accordance with Section 7.3.

## **ARTICLE 15 MISCELLANEOUS PROVISIONS**

### **§ 15.1 Assignment of Contract**

Neither party to the Contract shall assign the Contract as a whole without written consent of the other.

### **§ 15.2 Tests and Inspections**

**§ 15.2.1** At the appropriate times, the Contractor shall arrange and bear cost of tests, inspections, and approvals of portions of the Work required by the Contract Documents or by laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities.

**§ 15.2.2** If the Architect requires additional testing, the Contractor shall perform those tests.

**§ 15.2.3** The Owner shall bear cost of tests, inspections, or approvals that do not become requirements until after the Contract is executed. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

### **§ 15.3 Governing Law**

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules.

## **ARTICLE 16 TERMINATION OF THE CONTRACT**

### **§ 16.1 Termination by the Contractor**

If the Work is stopped under Section 12.3 for a period of 14 days through no fault of the Contractor, the Contractor may, upon seven additional days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed including reasonable overhead and profit, and costs incurred by reason of such termination.



**§ 16.2 Termination by the Owner for Cause**

**§ 16.2.1** The Owner may terminate the Contract if the Contractor

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

**§ 16.2.2** When any of the above reasons exist, the Owner, after consultation with the Architect, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may

- .1 take possession of the site and of all materials thereon owned by the Contractor, and
- .2 finish the Work by whatever reasonable method the Owner may deem expedient.

**§ 16.2.3** When the Owner terminates the Contract for one of the reasons stated in Section 16.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

**§ 16.2.4** If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the Owner. This obligation for payment shall survive termination of the Contract.

**§ 16.3 Termination by the Owner for Convenience**

The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause. The Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

**ARTICLE 17 OTHER TERMS AND CONDITIONS**

*(Insert any other terms or conditions below.)*

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

*(If required by law, insert cancellation period, disclosures or other warning statements above the signatures.)*

\_\_\_\_\_  
**OWNER** *(Signature)*

\_\_\_\_\_  
*(Printed name and title)*

\_\_\_\_\_  
**CONTRACTOR** *(Signature)*

\_\_\_\_\_  
*(Printed name and title)*

LICENSE NO.:

JURISDICTION:



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## DOCUMENT 00 6110 - SUPPLEMENTARY CONDITIONS

The following supplements modify, change, delete, or add to the General Conditions of the Contract for Construction, included in AIA Document A105-2017. Where any part of the General Conditions is modified or voided by these Articles, the unaltered provisions of that part shall remain in effect.

### ARTICLE 5: INSURANCE

Delete Paragraphs 5.1.1, 5.1.2, 5.1.3, 5.1.4, 5.1.5, 5.1.6 and 5.1.7.

NOTE: Contractor must comply with insurance requirements. Any Contractor circumventing legitimacy of insurance requirements (i.e., listing employees as sub-contractors) will not be considered for bid award.

Add the following Paragraphs 5.1.1 and 5.1.2 to Article 5:

5.1.1 The insurance required by Subparagraph 5.1 and indicated below shall be written for not less than the following limits:

1. Workers' Compensation:
  - (a) State: Statutory
  - (b) Employer's Liability: \$ 100,000 per Accident  
\$ 500,000 Disease, Policy Limit  
\$ 100,000 Disease, Each Employee
2. Comprehensive or Commercial General Liability (including Premises Operations; Independent Contractor's Protective; Products and Completed Operations; Broad Form Property Damage):
  - (a) Bodily Injury: \$ 500,000 Each Occurrence  
\$1,000,000 Aggregate
  - (b) Property Damage: \$ 500,000 Each Occurrence  
\$1,000,000 Aggregate
  - (c) Products and Completed Operations to be maintained for One year after final payment:  
\$1,000,000 Aggregate
  - (d) Property Damage Liability Insurance shall provide X, C and U coverage.
  - (e) Broad Form Property Damage Coverage shall include Completed Operations.
3. Contractual Liability:
  - (a) Bodily Injury: \$ 500,000 Each Occurrence  
\$1,000,000 Aggregate
  - (b) Property Damage: \$ 500,00 Each Occurrence  
\$1,000,000 Aggregate
4. Personal Injury, with Employment Exclusion deleted:  
\$1,000,000 Aggregate
5. Business Auto Liability (including owner, non-owned and hired vehicles):
  - (a) Combined Single Limit \$1,000,000
6. If the General Liability coverages are provided by a Commercial Liability policy, the
  - (a) General Aggregate shall be not less than \$1,000,000 and it shall apply, in total, to this Project only.
  - (b) Fire Damage Limit shall be not less than \$50,000 on any one Fire.
  - (c) Medical Expense Limit shall be not less than \$5,000 on any one person."

7. Umbrella Excess Liability:

- (a) An umbrella policy may be used in combination with other policies to provide a minimum coverage of \$1,000,000.

5.1.2 The Owner shall be named as an additional insured on the insurance required in 5.1.1.2 above and the insurance shall contain the severability of interest clause as follows:

- (a) "The insurance afforded herein applies separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the company's 'liability'."

Add the following Paragraph 5.6 to Article 5:

**5.6 PERFORMANCE BOND AND PAYMENT BOND**

5.6.1 The Owner shall have the right to require the Contractor to furnish bonds covering the faithful performance of the Contract and payment of obligations arising thereunder as stipulated in the Contract Documents on the date of execution of the Contract.

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

5.6.3 The Contractor shall furnish bonds or acceptable government obligations covering faithful performance of the Contract and payment of obligations arising thereunder. Bonds shall be obtained through a company licensed to transact business in the locality of the project and the cost thereof shall be included in the Contract Sum. The amount of each bond shall be equal to 100 percent of the Contract Sum.

5.6.3.1 The Contractor shall deliver the required bonds to the Owner not later than three days following the date the Agreement is entered into, 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.

5.6.3.2 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.

5.6.3.3 Form of bonds shall be AIA Document A312.

**ARTICLE 10: CHANGES IN THE WORK**

Add the following Paragraphs 10.4 and 10.5 to Article 10:

10.4 The combined overhead and profit included in the total cost to the Owner of 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, 15 percent of the cost.
- .2 For the Contractor, for Work performed by the contractor's Subcontractor, 5 percent of the amount due the Subcontractor.
- .3 For the Subcontractor or Sub-subcontractor involved, for Work performed by that Subcontractor's or Sub-subcontractor's own forces, 10 percent of the cost.
- .4 For each Subcontractor, for Work performed by the Subcontractor's Sub-subcontractors, 5 percent of the amount due the Sub-subcontractor.
- .5 Cost to which overhead and profit is to be applied shall be determined in accordance with Subparagraph 7.3.6.
- .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 be itemized also. In no case will a change involving over \$500.00 be approved without such itemization.

10.5 Agreement on any Change Order shall constitute a final settlement of all matters relating to the change in the Work which is the subject of the change Order, including, but not limited to, all direct and indirect costs associated with such change and any and all adjustments to the Contract Sum and the construction schedule. In the event a Change Order increases the contract Sum, the Contractor shall include the Work covered by such Change Order in Application for Payment as if such Work were originally

part of the Project and Contract Documents.

## **ARTICLE 12: PAYMENTS AND COMPLETION**

### **12.2 APPLICATIONS FOR PAYMENT**

Add the following Paragraph 12.2.1.1 to Article 12:

12.2.1.1 Progress payments shall represent 95% of the actual value of the work done and materials and equipment furnished and/or suitably stored at the jobsite or other approved location up to the first day of that month. In making such partial (monthly) payments, there shall be retained five percent (5%) on the estimated amounts until final completion and acceptance of all work covered by the Contract. Payments for work under the subcontracts of the General Contractor shall be subject to the above conditions. The form of Application for Payment shall be AIA Document G702, Application and Certification for Payment, supported by AIA Document G703, Continuation Sheet.

## **ARTICLE 15: MISCELLANEOUS PROVISIONS**

Add the following Paragraph 15.4 to Article 15:

### **15.4 EQUAL OPPORTUNITY**

15.4.1 The Contractor shall maintain policies of employment as follows:

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

15.4.1.2 The Contractor and the Contractor's Subcontractors shall, in all solicitation or advertisements for employees placed by them or on their behalf, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex, age or national origin.

## **END OF SUPPLEMENTARY CONDITIONS**

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# **AIA**® Document A312™ – 2010

## **Performance Bond**

**CONTRACTOR:**

(Name, legal status and address)

**SURETY:**

(Name, legal status and principal place of business)

**OWNER:**

(Name, legal status and address)

**CONSTRUCTION CONTRACT**

Date:

Amount: \$

Description:

(Name and location)

**BOND**

Date:

(Not earlier than Construction Contract Date)

Amount: \$

Modifications to this Bond: ☐ None ☐ See Section 16

**CONTRACTOR AS PRINCIPAL**

Company: (Corporate Seal)

**SURETY**

Company: (Corporate Seal)

Signature: \_\_\_\_\_

Name and

Title:

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

Signature: \_\_\_\_\_

Name and

Title:

(FOR INFORMATION ONLY — Name, address and telephone)

**AGENT or BROKER:**

**OWNER'S REPRESENTATIVE:**

(Architect, Engineer or other party:)

**ADDITIONS AND DELETIONS:**

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

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

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

Init.

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

- .1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;
- .2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
- .3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

- .1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
- .2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.



§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

- .1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
- .2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and
- .3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

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

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

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

#### § 14 Definitions

§ 14.1 **Balance of the Contract Price.** The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

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

§ 14.3 **Contractor Default.** Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

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

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



§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

*(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)*

**CONTRACTOR AS PRINCIPAL**

Company: \_\_\_\_\_ *(Corporate Seal)*

Signature: \_\_\_\_\_

Name and Title: \_\_\_\_\_

Address: \_\_\_\_\_

**SURETY**

Company: \_\_\_\_\_ *(Corporate Seal)*

Signature: \_\_\_\_\_

Name and Title: \_\_\_\_\_

Address: \_\_\_\_\_

# AIA<sup>®</sup> Document A312<sup>™</sup> – 2010

## Payment Bond

**CONTRACTOR:**

(Name, legal status and address)

**SURETY:**

(Name, legal status and principal place of business)

**OWNER:**

(Name, legal status and address)

**CONSTRUCTION CONTRACT**

Date:

Amount: \$

Description:

(Name and location)

**BOND**

Date:

(Not earlier than Construction Contract Date)

Amount: \$

Modifications to this Bond: ☐ None ☐ See Section 18

**CONTRACTOR AS PRINCIPAL**

Company: (Corporate Seal)

**SURETY**

Company: (Corporate Seal)

Signature: \_\_\_\_\_

Name and

Title:

Signature: \_\_\_\_\_

Name and

Title:

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

(FOR INFORMATION ONLY — Name, address and telephone)

**AGENT or BROKER:**

**OWNER'S REPRESENTATIVE:**

(Architect, Engineer or other party:)

**ADDITIONS AND DELETIONS:**

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

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

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

Init.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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



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

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

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

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

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

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

#### § 16 Definitions

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

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

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

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

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

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

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

*(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)*

**CONTRACTOR AS PRINCIPAL**

**SURETY**

Company: \_\_\_\_\_ *(Corporate Seal)*

Company: \_\_\_\_\_ *(Corporate Seal)*

Signature: \_\_\_\_\_  
Name and Title: \_\_\_\_\_  
Address: \_\_\_\_\_

Signature: \_\_\_\_\_  
Name and Title: \_\_\_\_\_  
Address: \_\_\_\_\_

**Application and Certificate for Payment**

TO OWNER: PROJECT: APPLICATION NO: Distribution to: OWNER: ☐ ARCHITECT: ☐ CONTRACTOR: ☐ FIELD: ☐ OTHER: ☐

FROM CONTRACTOR: VIA ARCHITECT: PERIOD TO: CONTRACT FOR: CONTRACT DATE: PROJECT NOS: / /

**CONTRACTOR'S APPLICATION FOR PAYMENT**

Application is made for payment, as shown below, in connection with the Contract. Continuation Sheet, AIA Document G703, is attached.

1. ORIGINAL CONTRACT SUM..... \$

2. Net change by Change Orders ..... \$

3. CONTRACT SUM TO DATE (Line 1 ± 2) ..... \$

4. TOTAL COMPLETED & STORED TO DATE (Column G on G703) ..... \$

5. RETAINAGE:

a. 0 % of Completed Work (Column D + E on G703) \$

b. 0 % of Stored Material (Column F on G703) \$

Total Retainage (Lines 5a + 5b or Total in Column I of G703) ..... \$

6. TOTAL EARNED LESS RETAINAGE ..... \$ (Line 4 Less Line 5 Total)

7. LESS PREVIOUS CERTIFICATES FOR PAYMENT ..... \$ (Line 6 from prior Certificate)

8. CURRENT PAYMENT DUE ..... \$

9. BALANCE TO FINISH, INCLUDING RETAINAGE (Line 3 less Line 6) \$

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	\$	\$
Total approved this Month	\$	\$
TOTALS	\$	\$
NET CHANGES by Change Order	\$	

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:

By: \_\_\_\_\_ Date: \_\_\_\_\_

State of: \_\_\_\_\_

County of: \_\_\_\_\_

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_

Notary Public: \_\_\_\_\_

My Commission expires: \_\_\_\_\_

**ARCHITECT'S CERTIFICATE FOR PAYMENT**

In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED ..... \$

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

**ARCHITECT:**

By: \_\_\_\_\_ Date: \_\_\_\_\_

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract







## Continuation Sheet

AIA Document G702™-1992, Application and Certificate for Payment, or G732™-2009, Application and Certificate for Payment, Construction Manager as Adviser Edition, containing Contractor's signed certification is attached.

In tabulations below, amounts are in US dollars.

Use Column I on Contracts where variable retainage for line items may apply.

APPLICATION NO:

APPLICATION DATE:

PERIOD TO:

ARCHITECT'S PROJECT NO:

[illegible]

**CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.**

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## **SECTION 01 1000 - SUMMARY**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Retain or delete this article in all Sections of Project Manual.
- B. Section Includes:
  - 1. Project information.
  - 2. Work covered by Contract Documents.
  - 3. Work under separate contracts.
  - 4. Access to site.
  - 5. Work restrictions.
  - 6. Specification and drawing conventions.
  - 7. Miscellaneous provisions.
- C. Related Requirements:
  - 1. Section 01 5000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

#### **1.2 PROJECT INFORMATION**

- A. Project Identification: Rigby Pioneer Cemetery – Maintenance Building
  - 1. Project Location: 4033 East 300 North, Rigby, Idaho 83442.
- B. Owner: Rigby Pioneer Cemetery District, 4084 East 450 North, Rigby, Idaho 83442.
  - 1. Owner's Representative: Randy Rolfe.
- C. Architect: NBW Architects, P.A., 990 John Adams Parkway, P.O. Box 2212, Idaho Falls, Idaho 83403, Telephone: 208-522-8779. Fax: 208-522-878.

#### **1.3 WORK COVERED BY CONTRACT DOCUMENTS**

- A. The Work of Project is defined by the Contract Documents and consists of the following:
  - 1. Construct new wood frame building including associated site work, plumbing, HVAC and electrical work.
- B. Type of Contract.
  - 1. Project will be constructed under a single prime contract.

#### **1.4 WORK UNDER SEPARATE CONTRACTS**

- A. General: Cooperate fully with the Owner and/or separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.
- B. Concurrent Work: Owner will construct or award separate contract(s) for the Work indicated on the drawings as Owner provided. Those operations will be conducted simultaneously with work under this Contract.

#### **1.5 ACCESS TO SITE**

- A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.
- B. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

## **1.6 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. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
  - 1. Notify Owner not less than two days in advance of proposed utility interruptions.
- C. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet of entrances, operable windows, or outdoor-air intakes.
- D. Restricted Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

## **1.7 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 01 General Requirements: Requirements of Sections in Division 01 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 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/or scheduled on Drawings.

## **PART 2 - PRODUCTS (Not Used)**

## **PART 3 - EXECUTION (Not Used)**

## **END OF SECTION 01 1000**

## **SECTION 01 2500 - SUBSTITUTION PROCEDURES**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Requirements:
  - 1. Section 01 6000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

#### **1.2 DEFINITIONS**

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

#### **1.3 ACTION SUBMITTALS**

- A. Substitution Requests: Submit three 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. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
    - j. 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.
    - k. Cost information, including a proposal of change, if any, in the Contract Sum.
    - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
    - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
  - 3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
    - a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.

- b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

#### **1.4 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.

### **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 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:
    - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    - b. Requested substitution provides sustainable design characteristics that specified product provided.
    - c. Requested substitution will not adversely affect Contractor's construction schedule.
    - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
    - e. Requested substitution is compatible with other portions of the Work.
    - f. Requested substitution has been coordinated with other portions of the Work.
    - g. Requested substitution provides specified warranty.
    - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Not allowed.

### **PART 3 - EXECUTION (Not Used)**

**END OF SECTION 01 2500**

## **SECTION 01 2600 - CONTRACT MODIFICATION PROCEDURES**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

#### **1.2 MINOR CHANGES IN THE WORK**

- A. Architect will issue supplemental instructions 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."

#### **1.3 PROPOSAL REQUESTS**

- A. Owner-Initiated Proposal Requests: 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 time specified in Proposal Request or 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.
- B. Contractor-Initiated Work Change Proposals: 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 2500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
  - 7. Work Change Proposal Request Form: Use form acceptable to Architect.

#### **1.4 CHANGE ORDER PROCEDURES**

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

#### **1.5 CONSTRUCTION CHANGE DIRECTIVE**

- A. Construction Change Directive: 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 2600**



## **SECTION 01 2900 - PAYMENT PROCEDURES**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

#### **1.2 SCHEDULE OF VALUES**

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
  - 1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
  - 2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- 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 line item for each Specification Section.
  - 1. Arrange schedule of values consistent with format of AIA Document G703.
  - 2. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
  - 3. 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.
  - 4. 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.
  - 5. Overhead Costs: Include total cost and proportionate share of general overhead and profit for each line item.
  - 6. Overhead Costs: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
  - 7. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
  - 8. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

#### **1.3 APPLICATIONS FOR PAYMENT**

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
- B. 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. Payment Application Times: Submit Application for Payment to Architect by the 25th of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
- D. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
- 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.
- F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
  2. When an application shows completion of an item, submit conditional final or full waivers.
  3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
  4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
  5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- H. 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. Sustainable design action plans, including preliminary project materials cost data.
  6. Schedule of unit prices.
  7. Submittal schedule (preliminary if not final).
  8. List of Contractor's staff assignments.
  9. List of Contractor's principal consultants.
  10. Copies of building permits.
  11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
  12. Initial progress report.
  13. Report of preconstruction conference.
  14. Certificates of insurance and insurance policies.
  15. Performance and payment bonds.
  16. Data needed to acquire Owner's insurance.
- I. 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.
- J. 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.
  5. AIA Document G706A.
  6. AIA Document G707.
  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 2900**

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## **SECTION 01 3100 - PROJECT MANAGEMENT AND COORDINATION**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
  - 1. Coordination drawings.
  - 2. Requests for Information (RFIs).
  - 3. Project meetings.
- B. Related Requirements:
  - 1. Section 01 7300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.

#### **1.2 DEFINITIONS**

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

#### **1.3 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. Include the following information in tabular form:
  - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
  - 2. Number and title of related Specification Section(s) covered by subcontract.
  - 3. Drawing number and detail references, as appropriate, covered by subcontract.

#### **1.4 GENERAL COORDINATION PROCEDURES**

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
  - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
  - 3. Make adequate provisions to accommodate items scheduled for later installation.
- 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 other 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.

## **1.5 COORDINATION DRAWINGS**

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, 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. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
    - b. 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. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid.
  - 2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings.
  - 3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
  - 4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
  - 5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
  - 6. 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.

## **1.6 REQUESTS FOR INFORMATION (RFIs)**

- 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 RFIs submitted to Architect by other entities controlled by Contractor with no response.
  - 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
  - 1. Project name.
  - 2. Project number.
  - 3. Date.
  - 4. Name of Contractor.
  - 5. Name of Architect.
  - 6. RFI number, numbered sequentially.
  - 7. RFI subject.
  - 8. Specification Section number and title and related paragraphs, as appropriate.
  - 9. Drawing number and detail references, as appropriate.
  - 10. Field dimensions and conditions, as appropriate.
  - 11. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  - 12. Contractor's signature.
  - 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
- C. RFI Forms: Software-generated form with substantially the same content as indicated above, acceptable to Architect.

- 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. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following RFIs will be returned without action:
    - a. Requests for approval of submittals.
    - b. Requests for approval of substitutions.
    - c. Requests for coordination information already indicated in the Contract Documents.
    - d. Requests for adjustments in the Contract Time or the Contract Sum.
    - e. Requests for interpretation of Architect's actions on submittals.
    - f. Incomplete RFIs or inaccurately prepared RFIs.
  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 RFIs 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 2600 "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 10 days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log monthly. Software log with not less than the following:
1. Project name.
  2. Name and address of Contractor.
  3. Name and address of Architect.
  4. RFI number including RFIs that were dropped and not submitted.
  5. RFI description.
  6. Date the RFI was submitted.
  7. Date Architect's response was received.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.
1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
  2. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

## **1.7 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 days of the meeting.
- B. Preconstruction Conference: Architect will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
1. Attendees: Authorized representatives of Owner Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  2. Agenda: Discuss items of significance that could affect progress, including the following:
    - a. Tentative construction schedule.
    - b. Critical work sequencing and long-lead items.
    - c. Designation of key personnel and their duties.
    - d. Procedures for processing field decisions and Change Orders.
    - e. Procedures for RFIs.
    - f. Procedures for testing and inspecting.
    - g. Procedures for processing Applications for Payment.
    - h. Distribution of the Contract Documents.
    - i. Submittal procedures.

- j. Preparation of record documents.
  - k. Use of the premises.
  - l. Work restrictions.
  - m. Responsibility for temporary facilities and controls.
  - n. Procedures for moisture and mold control.
  - o. Procedures for disruptions and shutdowns.
  - p. Construction waste management and recycling.
  - q. Parking availability.
  - r. Office, work, and storage areas.
  - s. Equipment deliveries and priorities.
  - t. First aid.
  - u. Security.
  - v. Progress cleaning.
3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity 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 of scheduled meeting dates.
  - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
    - a. Contract Documents.
    - b. Options.
    - c. Related RFIs.
    - d. Related Change Orders.
    - e. Purchases.
    - f. Deliveries.
    - g. Submittals.
    - h. Review of mockups.
    - i. Possible conflicts.
    - j. Compatibility problems.
    - k. Time schedules.
    - l. Weather limitations.
    - m. Manufacturer's written instructions.
    - n. Warranty requirements.
    - o. Compatibility of materials.
    - p. Acceptability of substrates.
    - q. Temporary facilities and controls.
    - r. Space and access limitations.
    - s. Regulations of authorities having jurisdiction.
    - t. Testing and inspecting requirements.
    - u. Installation procedures.
    - v. Coordination with other work.
    - w. Required performance results.
    - x. Protection of adjacent work.
    - y. Protection of construction and personnel.
  - 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
  - 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
  - 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Architect will conduct progress meetings at monthly intervals.
- 1. Attendees: In addition to representatives of Owner 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.
  - 2. 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) Interface requirements.
  - 2) Sequence of operations.
  - 3) Status of submittals.
  - 4) Deliveries.
  - 5) Off-site fabrication.
  - 6) Access.
  - 7) Site utilization.
  - 8) Temporary facilities and controls.
  - 9) Progress cleaning.
  - 10) Quality and work standards.
  - 11) Status of correction of deficient items.
  - 12) Field observations.
  - 13) Status of RFIs.
  - 14) Status of proposal requests.
  - 15) Pending changes.
  - 16) Status of Change Orders.
  - 17) Pending claims and disputes.
  - 18) Documentation of information for payment requests.
- 3. 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 3100**

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## **SECTION 01 3200 - CONSTRUCTION PROGRESS DOCUMENTATION**

### **PART 1 - GENERAL**

#### **1.1 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. Site condition reports.

#### **1.2 DEFINITIONS**

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
  - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
  - 2. Predecessor Activity: An activity that precedes another activity in the network.
  - 3. Successor Activity: An activity that follows another activity in the network.
- B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- D. Float: The measure of leeway in starting and completing an activity.
  - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Format for Submittals: Submit required submittals in the following format:
  - 1. Working electronic copy of schedule file, where indicated.
  - 2. PDF electronic file.
- B. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.
- C. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
- D. Construction Schedule Updating Reports: Submit with Applications for Payment.
- E. Daily Construction Reports: Submit at monthly intervals.
- F. Site Condition Reports: Submit at time of discovery of differing conditions.

#### **1.4 COORDINATION**

- A. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
  - 1. Secure time commitments for performing critical elements of the Work from entities involved.

2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

## **PART 2 - PRODUCTS**

### **2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL**

- A. Time Frame: Extend schedule from date established for commencement of the Work to date of final completion.
  1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- 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 20 days, unless specifically allowed by Architect.
  2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
  3. Submittal Review Time: Include review and resubmittal times indicated in Section 01 3300 "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 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 30 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. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
  2. Work Restrictions: Show the effect of the following items on the schedule:
    - a. Coordination with existing construction.
    - b. Limitations of continued occupancies.
    - c. Uninterruptible services.
    - d. Partial occupancy before Substantial Completion.
    - e. Use of premises restrictions.
    - f. Provisions for future construction.
    - g. Seasonal variations.
    - h. Environmental control.
  3. Work Stages: Indicate important stages of construction for each major portion of the Work.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.
- 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 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.
- G. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

## **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 30 days of date established for commencement of the Work.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
  - 1. For construction activities that require three 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.
  - 10. Stoppages, delays, shortages, and losses.
  - 11. Meter readings and similar recordings.
  - 12. Emergency procedures.
  - 13. Orders and requests of authorities having jurisdiction.
  - 14. Change Orders received and implemented.
  - 15. Construction Change Directives received and implemented.
  - 16. Services connected and disconnected.
  - 17. Equipment or system tests and startups.
  - 18. Partial completions and occupancies.
  - 19. Substantial Completions authorized.
- B. 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.

## **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 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 3200**

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## **SECTION 01 3300 - SUBMITTAL PROCEDURES**

### **PART 1 - GENERAL**

#### **1.1 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. Related Requirements:
  - 1. Section 01 3200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
  - 2. Section 01 7823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
  - 3. Section 01 7839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
  - 4. Section 01 7900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

#### **1.2 DEFINITIONS**

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action.
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

#### **1.3 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.

#### **1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS**

- A. Architect's Digital Data Files: Electronic copies of digital data files of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals.
  - 1. Architect will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings.
    - a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
    - b. Contractor shall execute a data licensing agreement in the form of AIA Document C106, Digital Data Licensing Agreement.
    - c. Due to the potential that the information set forth in the electronic files can be modified unintentionally or otherwise and that the files may not reflect changes made by addendum or during construction, the Architect does not warranty nor guarantee the suitability or content of the electronic files provided. It is recognized that the use of these electronic files will be at the Contractor's or user's sole risk and without liability to the Architect or Owner.
    - d. Electronic files available are those existing at the time of the request. Files will be provided by e-mail or on CD-ROM in Architect's standard format. Allow seven days for processing. Any translation or other modification necessary to make files usable for Contractor's purpose is the responsibility of the Contractor.
    - e. Architect's consultants may or may not provide electronic CAD or data files to Contractor at the consultant's sole discretion.
- 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. 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 resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
  1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
  2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
  3. Resubmittal Review: Allow 15 days for review of each resubmittal.
- D. Paper Submittals: 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 number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).
    - 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 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: Provide locations on form for the following information:
      - 1) Project name.
      - 2) Date.
      - 3) Destination (To:).
      - 4) Source (From:).
      - 5) Name and address of Architect.
      - 6) Name of Construction Manager.
      - 7) Name of Contractor.
      - 8) Name of firm or entity that prepared submittal.
      - 9) Names of subcontractor, manufacturer, and supplier.
      - 10) Category and type of submittal.
      - 11) Submittal purpose and description.
      - 12) Specification Section number and title.
      - 13) Specification paragraph number or drawing designation and generic name for each of multiple items.
      - 14) Drawing number and detail references, as appropriate.
      - 15) Indication of full or partial submittal.
      - 16) Transmittal number, numbered consecutively.
      - 17) Submittal and transmittal distribution record.
      - 18) Remarks.
      - 19) Signature of transmitter.



- E. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
  2. Name file with submittal number or other unique identifier, including revision identifier.
    - a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).
  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 software-generated form from electronic project management software or electronic form acceptable to Owner, containing the following information:
    - a. Project name.
    - b. Date.
    - c. Name and address of Architect.
    - d. Name of Construction Manager.
    - e. Name of Contractor.
    - f. Name of firm or entity that prepared submittal.
    - g. Names of subcontractor, manufacturer, and supplier.
    - h. Category and type of submittal.
    - i. Submittal purpose and description.
    - j. Specification Section number and title.
    - k. Specification paragraph number or drawing designation and generic name for each of multiple items.
    - l. Drawing number and detail references, as appropriate.
    - m. Location(s) where product is to be installed, as appropriate.
    - n. Related physical samples submitted directly.
    - o. Indication of full or partial submittal.
    - p. Transmittal number, numbered consecutively.
    - q. Submittal and transmittal distribution record.
    - r. Other necessary identification.
    - s. Remarks.
  5. Metadata: Include the following information as keywords in the electronic submittal file metadata:
    - a. Project name.
    - b. Number and title of appropriate Specification Section.
    - c. Manufacturer name.
    - d. Product name.
- F. Options: Identify options requiring selection by Architect.
- G. Deviations: Identify deviations from the Contract Documents on submittals.
- H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
1. Note date and content of previous submittal.
  2. Note date and content of revision in label or title block and clearly indicate extent of revision.
  3. Resubmit submittals until they are marked with approval notation from Architect'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:
1. Submit electronic submittals via email as PDF electronic files.
    - a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.

2. Action Submittals: Submit three paper copies of each submittal unless otherwise indicated. Architect will return two copies.
  3. Informational Submittals: Submit two paper copies of each submittal unless otherwise indicated. Architect will not return copies.
  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.
- 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 products and options are applicable.
  3. Include the following information, as applicable:
    - a. Manufacturer's catalog cuts.
    - b. Manufacturer's product specifications.
    - c. Standard color charts.
    - d. Statement of compliance with specified referenced standards.
    - e. Testing by recognized testing agency.
    - f. Application of testing agency labels and seals.
    - g. Notation of coordination requirements.
    - h. Availability and delivery time information.
  4. For equipment, include the following in addition to the above, as applicable:
    - a. Wiring diagrams 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.
    - b. Three paper copies of Product Data unless otherwise indicated. Architect will return two copies.
- 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, 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 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.
  3. For projects where electronic submittals are required, provide corresponding 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 one 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 submittal with options selected.
  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 two sets of Samples. Architect will retain one Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record sample.
      - 1) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
1. Submit product schedule in the following format:
    - a. PDF electronic file.
- F. Coordination Drawings Submittals: Comply with requirements specified in Section 01 3100 "Project Management and Coordination."
- G. Contractor's Construction Schedule: Comply with requirements specified in Section 01 3200 "Construction Progress Documentation."
- H. Application for Payment and Schedule of Values: Comply with requirements specified in Section 01 2900 "Payment Procedures."
- I. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 01 4000 "Quality Requirements."
- J. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 01 7700 "Closeout Procedures."
- K. Maintenance Data: Comply with requirements specified in Section 01 7823 "Operation and Maintenance Data."
- L. 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.
- M. 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.
- N. 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.
- O. 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.

- P. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- Q. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- R. 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.
- S. 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.
- T. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.
- U. Schedule of Tests and Inspections: Comply with requirements specified in Section 01 4000 "Quality Requirements."
- V. 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.
- W. 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.
- X. 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.
- Y. 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 paper copies 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.
- B. Project Closeout and Maintenance Material Submittals: See requirements in Section 01 7700 "Closeout Procedures."

- 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. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.
- C. 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.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

**END OF SECTION 01 3300**

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## **SECTION 01 4000 - QUALITY REQUIREMENTS**

### **PART 1 - GENERAL**

#### **1.1 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. 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.
  - 2. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
  - 3. Specific test and inspection requirements are not specified in this Section.

#### **1.2 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.
  - 1. Laboratory Mockups: Full-size physical assemblies constructed at testing facility to verify performance characteristics.
- D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- E. 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.
- F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. 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).
- J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

### **1.3 CONFLICTING REQUIREMENTS**

- A. Referenced Standards: If compliance with two 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. 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.

### **1.4 INFORMATIONAL SUBMITTALS**

- A. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:
  - 1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Architect.
  - 2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Architect.
- B. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

### **1.5 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 reinspecting.
- B. Manufacturer's Field Reports: Prepare written information documenting tests and inspections specified in other Sections. Include the following:
  - 1. Name, address, and telephone number of representative making report.
  - 2. Statement on condition of substrates and their acceptability for installation of product.
  - 3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
  - 4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  - 5. Other required items indicated in individual Specification Sections.
- C. 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.



## 1.6 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 product 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 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. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
  - 1. Contractor responsibilities include the following:
    - a. Provide test specimens representative of proposed products and construction.
    - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
    - c. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
    - d. When testing is complete, remove test specimens, assemblies, and mockups; do not reuse products on Project.
  - 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- 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 days in advance of dates and times when mockups will be constructed.
  - 3. Demonstrate the proposed range of aesthetic effects and workmanship.
  - 4. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
    - a. Allow seven days for initial review and each re-review of each mockup.

5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
  6. Demolish and remove mockups when directed unless otherwise indicated.
- K. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Specification Sections.

## 1.7 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 reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
1. 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.
  2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
  3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
  5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a manufacturer's representative to observe and inspect the Work. Manufacturer's representative's services include examination of substrates and conditions, verification of materials, inspection of completed portions of the Work, and submittal of written reports.
- D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- E. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
  2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
  3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
  4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
  5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
  6. Do not perform any duties of Contractor.
- 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. Delivery of samples to testing agencies.

6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
  7. Security and protection for samples and for testing and 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.

## **1.8 SPECIAL TESTS AND INSPECTIONS**

- A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:
- B. 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 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 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 reinspecting 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 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 7300 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

## **END OF SECTION 01 4000**

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## **SECTION 01 4200 - REFERENCES**

### **PART 1 - GENERAL**

#### **1.1 DEFINITIONS**

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

#### **1.2 INDUSTRY STANDARDS**

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
  - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

#### **1.3 ABBREVIATIONS AND ACRONYMS**

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."
- B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.
  - 1. DIN - Deutsches Institut für Normung e.V.; [www.din.de](http://www.din.de).
  - 2. IAPMO - International Association of Plumbing and Mechanical Officials; [www.iapmo.org](http://www.iapmo.org).
  - 3. ICC - International Code Council; [www.iccsafe.org](http://www.iccsafe.org).
  - 4. ICC-ES - ICC Evaluation Service, LLC; [www.icc-es.org](http://www.icc-es.org).

- C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.
1. COE - Army Corps of Engineers; [www.usace.army.mil](http://www.usace.army.mil).
  2. CPSC - Consumer Product Safety Commission; [www.cpsc.gov](http://www.cpsc.gov).
  3. DOC - Department of Commerce; National Institute of Standards and Technology; [www.nist.gov](http://www.nist.gov).
  4. DOD - Department of Defense; <http://dodssp.daps.dla.mil>.
  5. DOE - Department of Energy; [www.energy.gov](http://www.energy.gov).
  6. EPA - Environmental Protection Agency; [www.epa.gov](http://www.epa.gov).
  7. FAA - Federal Aviation Administration; [www.faa.gov](http://www.faa.gov).
  8. FG - Federal Government Publications; [www.gpo.gov](http://www.gpo.gov).
  9. GSA - General Services Administration; [www.gsa.gov](http://www.gsa.gov).
  10. HUD - Department of Housing and Urban Development; [www.hud.gov](http://www.hud.gov).
  11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; <http://eetd.lbl.gov>.
  12. OSHA - Occupational Safety & Health Administration; [www.osha.gov](http://www.osha.gov).
  13. SD - Department of State; [www.state.gov](http://www.state.gov).
  14. TRB - Transportation Research Board; National Cooperative Highway Research Program; [www.trb.org](http://www.trb.org).
  15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; [www.ars.usda.gov](http://www.ars.usda.gov).
  16. USDA - Department of Agriculture; Rural Utilities Service; [www.usda.gov](http://www.usda.gov).
  17. USDJ - Department of Justice; Office of Justice Programs; National Institute of Justice; [www.ojp.usdoj.gov](http://www.ojp.usdoj.gov).
  18. USP - U.S. Pharmacopeia; [www.usp.org](http://www.usp.org).
  19. USPS - United States Postal Service; [www.usps.com](http://www.usps.com).
- D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list.
1. CFR - Code of Federal Regulations; Available from Government Printing Office; [www.gpo.gov/fdsys](http://www.gpo.gov/fdsys).
  2. DOD - Department of Defense; Military Specifications and Standards; Available from Department of Defense Single Stock Point; <http://dodssp.daps.dla.mil>.
  3. DSCC - Defense Supply Center Columbus; (See FS).
  4. FED-STD - Federal Standard; (See FS).
  5. FS - Federal Specification; Available from Department of Defense Single Stock Point; <http://dodssp.daps.dla.mil>.
    - a. Available from Defense Standardization Program; [www.dsp.dla.mil](http://www.dsp.dla.mil).
    - b. Available from General Services Administration; [www.gsa.gov](http://www.gsa.gov).
    - c. Available from National Institute of Building Sciences/Whole Building Design Guide; [www.wbdg.org/ccb](http://www.wbdg.org/ccb).
  6. MILSPEC - Military Specification and Standards; (See DOD).
  7. USAB - United States Access Board; [www.access-board.gov](http://www.access-board.gov).
  8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION 01 4200**

## **SECTION 01 5000 - TEMPORARY FACILITIES AND CONTROLS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
  - 1. Section 01 1000 "Summary" for work restrictions and limitations on utility interruptions.

#### **1.2 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, Architect, testing agencies, and authorities having jurisdiction.

#### **1.3 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.

#### **1.4 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.

#### **1.5 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 TEMPORARY FACILITIES**

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly.
- C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

## **2.2 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 7700 "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.
- 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. General: Install temporary service or connect to existing service.
  - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
  - 1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, 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.
- E. Heating: Provide temporary heating required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
- G. 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 underground unless otherwise indicated.
- H. 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.
- I. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one telephone line(s) for each field office.
  - 1. Provide additional telephone lines for the following:



- a. Provide a dedicated telephone line for each facsimile machine in each field office.
2. At each telephone, post a list of important telephone numbers.
  - a. Police and fire departments.
  - b. Ambulance service.
  - c. Contractor's home office.
  - d. Contractor's emergency after-hours telephone number.
  - e. Architect's office.
  - f. Engineers' offices.
  - g. Owner's office.
  - h. Principal subcontractors' field and home offices.
3. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

### 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 Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings.
  1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.
- C. Temporary Use of 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 2000 "Earth Moving."
  3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
  4. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Substantial Completion. Repair hot-mix asphalt base-course pavement before installation of final course according to Section 32 1216 "Asphalt Paving."
- D. Traffic Controls: Comply with requirements of authorities having jurisdiction.
  1. Protect existing site improvements to remain including curbs, pavement, and utilities.
  2. Maintain access for fire-fighting equipment and access to fire hydrants.
- E. Parking: Provide temporary parking areas for construction personnel.
- F. 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.
- G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
  1. Identification Signs: Provide Project identification signs as indicated on Drawings.
  2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
    - a. Provide temporary, directional signs for construction personnel and visitors.
  3. Maintain and touchup signs so they are legible at all times.

- H. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 01 7300 "Execution."
- I. 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.
- J. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.
- K. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

### **3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION**

- A. 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.
- B. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of 2003 EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent.
- C. 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.
- D. 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.
- E. 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 limit lines 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.
- F. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
- G. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- H. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- I. 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 not complete, insulate temporary enclosures.
- J. 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 materials from water damage and keep porous and organic materials from coming into prolonged contact with concrete.
- 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. Discard or replace water-damaged and wet material.
  4. Discard, replace, or clean stored or installed material that begins to grow mold.
  5. 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. Remove materials that can not be completely restored to their manufactured moisture level within 48 hours.

### **3.6 OPERATION, TERMINATION, AND REMOVAL**

- A. Maintenance: Maintain facilities in good operating condition until removal.
  1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- B. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- C. 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. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 7700 "Closeout Procedures."

**END OF SECTION 01 5000**

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## **SECTION 01 6000 - PRODUCT REQUIREMENTS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
  - 1. Section 01 2500 "Substitution Procedures" for requests for substitutions.

#### **1.2 DEFINITIONS**

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
  - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
  - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

#### **1.3 ACTION SUBMITTALS**

- A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
    - a. Form of Approval: As specified in Section 01 3300 "Submittal Procedures."
    - b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 01 3300 "Submittal Procedures." Show compliance with requirements.

#### **1.4 QUALITY ASSURANCE**

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

#### **1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

- B. Delivery and Handling:
1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
  2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
  4. Inspect products on delivery to determine compliance with the Contract Documents and to determine 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. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
  5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
  6. Protect stored products from damage and liquids from freezing.

## **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: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
  2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
  2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
  3. Refer to other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 01 7700 "Closeout Procedures."

## **PART 2 - PRODUCTS**

### **2.1 PRODUCT SELECTION PROCEDURES**

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
  2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
  4. Where products are accompanied by the term "as selected," Architect will make selection.
  5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
- B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
  2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
  3. Products:
    - a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
    - b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
  4. Manufacturers:
    - a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered unless otherwise indicated.
    - b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.
  5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
- C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 2500 "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

## 2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
1. Evidence that the proposed product does not require revisions 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.
  4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
  5. Samples, if requested.

## PART 3 - EXECUTION (Not Used)

## END OF SECTION 01 6000

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## **SECTION 01 7300 - EXECUTION**

### **PART 1 - GENERAL**

#### **1.1 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 1000 "Summary" for limits on use of Project site.
  - 2. Section 01 7700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
  - 3. Section 07 8413 "Penetration Firestopping" for patching penetrations in fire-rated construction.

#### **1.2 INFORMATIONAL SUBMITTALS**

- A. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.
- B. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

#### **1.3 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 element 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.
  - 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.
  - 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

### **PART 2 - PRODUCTS**

#### **2.1 MATERIALS**

- A. 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, 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 3100 "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 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.
- B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
  - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.

### **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.
- 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. 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: 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.
- F. 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.
  - 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
  - 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.
- G. 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 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 days during normal weather or three days if the temperature is expected to rise above 80 deg F.
  - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- 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.
- 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.

### **3.8 STARTING AND ADJUSTING**

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: Comply with qualification requirements in Section 01 4000 "Quality Requirements"

### **3.9 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 7300**

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## **SECTION 01 7419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for the following:
  - 1. Disposing of nonhazardous construction waste.
- B. Related Requirements:
  - 1. Section 04 4313.13 "Anchored Stone Masonry Veneer" for disposal requirements for excess stone and stone waste.
  - 2. Section 31 1000 "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

#### **1.2 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. 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.

### **PART 2 - PRODUCTS (Not Used)**

### **PART 3 - EXECUTION**

#### **3.1 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 7419**

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## **SECTION 01 7700 - CLOSEOUT PROCEDURES**

### **PART 1 - GENERAL**

#### **1.1 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 7823 "Operation and Maintenance Data" for operation and maintenance manual requirements.
  - 2. Section 01 7839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
  - 3. Section 01 7900 "Demonstration and Training" for requirements for instructing Owner's personnel.

#### **1.2 ACTION SUBMITTALS**

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

#### **1.3 CLOSEOUT SUBMITTALS**

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest control inspection.

#### **1.4 MAINTENANCE MATERIAL SUBMITTALS**

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

#### **1.5 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 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 photographic documentation, 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 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
  2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
  3. Complete startup and testing of systems and equipment.
  4. Perform preventive maintenance on equipment used prior to Substantial Completion.
  5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 01 7900 "Demonstration and Training."
  6. Advise Owner of changeover in heat and other utilities.
  7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
  8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  9. Complete final cleaning requirements, including touchup painting.
  10. 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 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. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
  2. Results of completed inspection will form the basis of requirements for final completion.

## 1.6 FINAL COMPLETION PROCEDURES

- A. Preliminary Procedures: Before requesting final inspection for determining final completion, complete the following:
1. Submit a final Application for Payment according to Section 01 2900 "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.
  4. Submit pest-control final inspection report and warranty.
  5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
  6. Complete SFD checklist.
  7. Complete Owner's commissioning agents requirements.
- B. Inspection: Submit a written request for final inspection to determine acceptance. 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. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

## 1.7 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.
  2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

3. Submit list of incomplete items in the following format:
  - a. PDF electronic file. Architect will return annotated copy.

## **1.8 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. Organize warranty documents into an orderly sequence based on the table of contents of the 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 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.
- C. 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. Remove snow and ice to provide safe access to building.
    - f. 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.
    - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    - h. Sweep concrete floors broom clean in unoccupied spaces.
    - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
    - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.

- k. Remove labels that are not permanent.
  - l. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
  - m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
  - n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
  - o. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
  - p. Leave Project clean and ready for occupancy.
- C. Pest Control: Comply with pest control requirements in Section 01 5000 "Temporary Facilities and Controls." Prepare written report.

### **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 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 7700**

## **SECTION 01 7823 - OPERATION AND MAINTENANCE DATA**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
  - 1. Operation and maintenance documentation directory.
  - 2. Emergency manuals.
  - 3. Operation manuals for systems, subsystems, and equipment.
  - 4. Product maintenance manuals.
  - 5. Systems and equipment maintenance manuals.

#### **1.2 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 paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Architect will return two copies.
- C. Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.
  - 1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.

### **PART 2 - PRODUCTS**

#### **2.1 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS**

- 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.
- B. 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.
- C. Title Page: Include the following information:
  - 1. Subject matter included in manual.
  - 2. Name and address of Project.
  - 3. Name and address of Owner.
  - 4. Date of submittal.
  - 5. Name and contact information for Contractor.
  - 6. Name and contact information for Construction Manager.
  - 7. Name and contact information for Architect.

8. Name and contact information for Commissioning Authority.
  9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
  10. Cross-reference to related systems in other operation and maintenance manuals.
- D. 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.
- E. 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.
- F. 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.
- G. 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 paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
    - a. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and 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. 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.

## 2.2 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for each of the following:
1. Type of emergency.
  2. Emergency instructions.
  3. Emergency procedures.
- B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
1. Fire.
  2. Flood.
  3. Gas leak.
  4. Water leak.
  5. Power failure.
  6. Water outage.
  7. System, subsystem, or equipment failure.
  8. Chemical release or spill.

- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D. Emergency Procedures: Include the following, as applicable:
  1. Instructions on stopping.
  2. Shutdown instructions for each type of emergency.
  3. Operating instructions for conditions outside normal operating limits.
  4. Required sequences for electric or electronic systems.
  5. Special operating instructions and procedures.

## 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 is 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.
- 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.

## 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.
- 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.
  - 6. Demonstration and training video recording, if available.
- 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.
- 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. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.



- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

### **PART 3 - EXECUTION**

#### **3.1 MANUAL PREPARATION**

- A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- B. 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.
- 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 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.
- 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.
- F. Comply with Section 01 7700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

**END OF SECTION 01 7823**

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## **SECTION 01 7839 - PROJECT RECORD DOCUMENTS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for project record documents, including the following:
  - 1. Record Drawings.
  - 2. Record Specifications.
  - 3. Record Product Data.
- B. Related Requirements:
  - 1. Section 01 7823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

#### **1.2 CLOSEOUT SUBMITTALS**

- A. Record Drawings: Comply with the following:
  - 1. Number of Copies: Submit one set(s) of marked-up record prints.
- B. Record Specifications: Submit one paper copy and scanned PDF file of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one paper copy and scanned PDF file of each submittal.

### **PART 2 - PRODUCTS**

#### **2.1 RECORD DRAWINGS**

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised Drawings as modifications are issued.
  - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
    - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - b. Record data as soon as possible after obtaining it.
    - c. Record and check the markup before enclosing concealed installations.
  - 2. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
  - 3. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
  - 4. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

#### **2.2 RECORD SPECIFICATIONS**

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
  - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  - 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
  - 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
  - 4. Note related Change Orders, record Product Data, and record Drawings where applicable.
- B. Format: Submit record Specifications as paper copy and scanned PDF electronic file(s) of marked-up paper copy of Specifications.

## **2.3 RECORD PRODUCT DATA**

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
  - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  - 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
  - 3. Note related Change Orders, record Specifications, and record Drawings where applicable.
- B. Format: Submit record Product Data as paper copy and scanned PDF electronic file(s) of marked-up paper copy of Product Data.

## **2.4 MISCELLANEOUS RECORD SUBMITTALS**

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as paper copy and scanned PDF electronic file(s) of marked-up miscellaneous record submittals.

## **PART 3 - EXECUTION**

### **3.1 RECORDING AND MAINTENANCE**

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.
- B. 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 7839**

## **SECTION 01 7900 - DEMONSTRATION AND TRAINING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
  - 1. Demonstration of operation of systems, subsystems, and equipment.
  - 2. Training in operation and maintenance of systems, subsystems, and equipment.
  - 3. Demonstration and training video recordings.

#### **1.2 INFORMATIONAL SUBMITTALS**

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
  - 1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

#### **1.3 QUALITY ASSURANCE**

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 01 4000 "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 01 3100 "Project Management and Coordination." Review methods and procedures related to demonstration and training.

#### **1.4 COORDINATION**

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

### **PART 2 - PRODUCTS**

#### **2.1 INSTRUCTION PROGRAM**

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
  - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
    - a. System, subsystem, and equipment descriptions.
    - b. Performance and design criteria if Contractor is delegated design responsibility.
    - c. Operating standards.
    - d. Regulatory requirements.
    - e. Equipment function.
    - f. Operating characteristics.

- g. Limiting conditions.
- h. Performance curves.
- 2. Documentation: Review the following items in detail:
  - a. Emergency manuals.
  - b. Operations manuals.
  - c. Maintenance manuals.
  - d. Project record documents.
  - e. Identification systems.
  - f. Warranties and bonds.
  - g. Maintenance service agreements and similar continuing commitments.
- 3. Emergencies: Include the following, as applicable:
  - a. Instructions on meaning of warnings, trouble indications, and error messages.
  - b. Instructions on stopping.
  - c. Shutdown instructions for each type of emergency.
  - d. Operating instructions for conditions outside of normal operating limits.
  - e. Sequences for electric or electronic systems.
  - f. Special operating instructions and procedures.
- 4. Operations: Include the following, as applicable:
  - a. Startup procedures.
  - b. Equipment or system break-in procedures.
  - c. Routine and normal operating instructions.
  - d. Regulation and control procedures.
  - e. Control sequences.
  - f. Safety procedures.
  - g. Instructions on stopping.
  - h. Normal shutdown instructions.
  - i. Operating procedures for emergencies.
  - j. Operating procedures for system, subsystem, or equipment failure.
  - k. Seasonal and weekend operating instructions.
  - l. Required sequences for electric or electronic systems.
  - m. Special operating instructions and procedures.
- 5. Adjustments: Include the following:
  - a. Alignments.
  - b. Checking adjustments.
  - c. Noise and vibration adjustments.
  - d. Economy and efficiency adjustments.
- 6. Troubleshooting: Include the following:
  - a. Diagnostic instructions.
  - b. Test and inspection procedures.
- 7. Maintenance: Include the following:
  - a. Inspection procedures.
  - b. Types of cleaning agents to be used and methods of cleaning.
  - c. List of cleaning agents and methods of cleaning detrimental to product.
  - d. Procedures for routine cleaning
  - e. Procedures for preventive maintenance.
  - f. Procedures for routine maintenance.
  - g. Instruction on use of special tools.
- 8. Repairs: Include the following:
  - a. Diagnosis instructions.
  - b. Repair instructions.
  - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - d. Instructions for identifying parts and components.
  - e. Review of spare parts needed for operation and maintenance.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 01 7823 "Operation and Maintenance Data."

### **3.2 INSTRUCTION**

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
  - 1. Architect will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
  - 2. Owner will furnish an instructor to describe Owner's operational philosophy.
  - 3. Owner will furnish Contractor with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
  - 1. Schedule training with Owner with at least seven days' advance notice.
- D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.

**END OF SECTION 01 7900**

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### **DIVISION 03 – CONCRETE**

033000    CAST-IN-PLACE CONCRETE

## **SECTION 03 3000 - CAST-IN-PLACE CONCRETE**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture.
- C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Material certificates.
- B. Material test reports.

#### **1.4 QUALITY ASSURANCE**

- A. 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.
- B. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
- C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."
- D. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
  - 1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
  - 2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

#### **1.5 PROJECT CONDITIONS**

- A. Protection of Footings Against Freezing: Cover completed work at footing level with sufficient temporary or permanent cover as required to protect footings and adjacent subgrade against possibility of freezing; maintain cover for time period as necessary.
- B. Surface Protection: Protect adjacent finish materials against spatter during concrete placement.

### **PART 2 - PRODUCTS**

#### **2.1 STEEL REINFORCEMENT**

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- 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."

## 2.2 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
1. Portland Cement: Varies, see general structural notes sheet S001
    - a. Fly Ash: ASTM C 618, Class F.
      - 1) Fly ash shall not be used in the mix for concrete in exterior service.
        - a) Concrete in exterior service includes all exterior flat work, including but not limited to walks, curb and gutter, mow strips, equipment pads, etc. and perimeter foundation walls and footings.
- B. Normal-Weight Aggregates: ASTM C 33, graded.
1. Maximum Coarse-Aggregate Size: See general structural notes, sheet S001
  2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in the cement (ASR). This reactivity has been less of a problem in concrete that remains completely dry in service. A lithium additive to the concrete has shown to be effective in eliminating the effects of the reactivity. Some in the industry have maintained that replacing the cement content with 20-25% fly ash controls the reactivity; however, there is no consensus on this approach. Therefore, unless test results can be produced by the concrete supplier indicating that there is no deleterious reactivity (ASR) between their aggregate and the cement, a lithium additive shall be used in the mix for concrete in exterior service, including all flat work and perimeter foundations. Interior concrete, including interior foundations and slabs may utilize 25% fly ash in the mix design.)
- C. Water: ASTM C 94/C 94M and potable.
- D. Alkali Silica Reactivity (ASR) considerations:
1. Contractor shall submit previous test results on the proposed mix which demonstrate adequate performance with respect to ASR as follows:
    - a. Historic test results of the proposed mix shall demonstrate the concrete mix has a total expansion less than .08% at 28 days when tested in accordance with USACE CRD C662.
  2. When lithium nitrate is used to address ASR the following requirements shall be followed:
    - a. Apply per manufacturer's recommendation for dosage and mixing for the maximum cement alkali content.
    - b. Fly ash shall not be included in the mix.
    - c. Dosage rates of treatments of lithium nitrate shall be reported on batch tickets.

## 2.3 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
- 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.
  7. Alkali-Silica Reactivity Inhibiting Admixture:
    - a. Specially formulated lithium nitrate admixture for prevention of alkali-silica reactivity (ASR) in concrete. Admixture must have test data indicating conformance to ASTM C1293.
      - 1) Acceptable Products:
        - a) Eucon Integral ARC by Euclid.
        - b) RASIR by W R Grace.
        - c) Equal as approved by Architect before use.
    - b. Lithium additive is required in concrete in exterior service (flat work, perimeter foundation walls, etc.).

## **2.4 VAPOR RETARDERS**

- A. Sheet Vapor Retarder: ASTM E 1745, Class A. Permeance less than 0.01 perms before and after conditioning tests (ASTM E 1745 paragraphs 7.1.1-5). Include manufacturer's recommended adhesive or pressure-sensitive tape.
  - 1. Products:
    - a. Poly-America; Yellow Guard, 15 mils.
    - b. Reef Industries; Vaporguard, 15 mils.
    - c. Stego Industries, LLC; Stego Wrap, 15 mils.

## **2.5 CURING MATERIALS**

- A. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

## **2.6 RELATED MATERIALS**

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

## **2.7 CONCRETE MIXTURES**

- 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.
- B. Cementitious Materials: Use fly ash as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 25 percent.
- C. 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.
- D. Proportion normal-weight concrete mixture for concrete exposed to weather in service as follows:
  - 1. Minimum Compressive Strength: See general structural notes, sheet S001
  - 2. Maximum Water-Cementitious Materials Ratio: 0.45.
  - 3. Slump Limit: 3 inches or 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
  - 4. Air Content: See general structural notes, sheet S001
  - 5. Lithium additive.
- E. Proportion normal-weight concrete mixture for concrete not exposed to weather in service as follows:
  - 1. Minimum Compressive Strength: 3500 psi at 28 days.
  - 2. Maximum Water-Cementitious Materials Ratio: 0.50.
  - 3. Slump Limit: 4 inches or 8 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch.
  - 4. Air Content: See general structural notes, sheet S001
  - 5. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.

## **2.8 FABRICATING REINFORCEMENT**

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

## **2.9 CONCRETE MIXING**

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.
  - 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 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. Chamfer exterior corners and edges of permanently exposed concrete.

### **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.

### **3.3 VAPOR RETARDERS**

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
  - 1. Lap joints 6 inches and seal with manufacturer's recommended tape.

### **3.4 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.

### **3.5 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.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:
  - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
  - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: 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.
- E. Waterstops: Install in construction joints and at other joints indicated according to manufacturer's written instructions.

### **3.6 CONCRETE PLACEMENT**

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Deposit concrete continuously in one 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. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
- C. Installation Tolerances:
  1. Slabs: Minimum Flatness FF of 30 and Minimum Levelness FL of 25.
  2. Slabs to Receive Special Finish: Minimum Flatness FF of 50 and Minimum Levelness FL of 35.
  3. Walls: Comply with ACI requirements for horizontal, vertical, and story to story tolerances.
- D. Cold-Weather Placement: Comply with ACI 306.1.
- E. Hot-Weather Placement: Comply with ACI 301.

### **3.7 FINISHING FLOORS AND SLABS**

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- 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 direction.
  1. Apply scratch finish to surfaces 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. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraighening until surface is left with a uniform, smooth, granular texture.
  1. Apply float finish to surfaces to receive trowel finish.
- D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten 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 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.
  2. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 3/16 inch.
- 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, ramps, and elsewhere as indicated.

### **3.8 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. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
  1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.
  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 days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
  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 hours after initial application. Maintain continuity of coating and repair damage during curing period.

- a. Removal: 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.
4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

### **3.9 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.

### **3.10 FIELD QUALITY CONTROL**

- A. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

**END OF SECTION 03 3000**

## **TABLE OF CONTENTS**

### **DIVISION 05 - METALS**

055000 METAL FABRICATIONS



## **SECTION 05 5000 - METAL FABRICATIONS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Miscellaneous steel trim.
  - 2. Metal bollards.
- B. Products furnished, but not installed, under this Section include the following:
  - 1. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
  - 2. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

### **PART 2 - PRODUCTS**

#### **2.1 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, ambient; 180 deg F, material surfaces.

#### **2.2 METALS**

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Steel Pipe: ASTM A 53/A 53M, Standard Weight (Schedule 40) unless otherwise indicated.
- D. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
  - 1. Size of Channels: 1-5/8 by 1-5/8 inches.

#### **2.3 FASTENERS**

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
- B. 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.
- C. 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, Class Fe/Zn 5, unless otherwise indicated.
  - 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.
- D. Slotted-Channel Inserts: Cold-formed, hot-dip galvanized-steel box channels (struts) complying with MFMA-4, 1-5/8 by 7/8 inches by length indicated with anchor straps or studs not less than 3 inches long at not more than 8 inches o.c. Provide with temporary filler and tee-head bolts, complete with washers and nuts, all zinc-plated to comply with ASTM B 633, Class Fe/Zn 5, as needed for fastening to inserts.

## **2.4 MISCELLANEOUS MATERIALS**

- A. 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.
- B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- D. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- E. Concrete: Comply with requirements in Section 03 3000 "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi.

## **2.5 FABRICATION, GENERAL**

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Use connections that maintain structural value of joined pieces.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges. Remove sharp or rough areas on exposed surfaces.
- C. Weld corners and seams continuously to comply with the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended.
- D. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Locate joints where least conspicuous.
- E. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- F. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors not less than 8 inches from ends and corners of units and 24 inches o.c.

## **2.6 MISCELLANEOUS STEEL TRIM**

- A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
- C. Galvanize exterior miscellaneous steel trim.
- D. Prime exterior miscellaneous steel trim with zinc-rich primer.

## **2.7 METAL BOLLARDS**

- A. Fabricate metal bollards from Schedule 40 steel pipe.
- B. Fabricate sleeves for bollard anchorage from steel pipe with 1/4-inch-thick steel plate welded to bottom of sleeve.

- C. Prime bollards with zinc-rich primer.

## **2.8 FINISHES, GENERAL**

- A. Finish metal fabrications after assembly.

## **2.9 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.
- 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 zinc-rich primer is 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. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
  - 3. Items Indicated to Receive Primers Specified in Section 09 9600 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
  - 4. 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.

## **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.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

### **3.2 INSTALLING METAL BOLLARDS**

- A. Anchor bollards in concrete with pipe sleeves preset and anchored into concrete in formed or core-drilled holes. Fill annular space around bollard solidly with nonshrink grout.
- B. Fill bollards solidly with concrete, mounding top surface to shed water.

### **3.3 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.

**END OF SECTION 05 5000**

## **T A B L E O F C O N T E N T S**

### **DIVISION 06 – WOOD, PLASTICS AND COMPOSITES**

061000	ROUGH CARPENTRY
061600	SHEATHING
061753	SHOP-FABRICATED WOOD TRUSSES
062023	INTERIOR FINISH CARPENTRY
066400	PLASTIC PANELING

## **SECTION 06 1000 - ROUGH CARPENTRY**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Framing with dimension lumber.
  - 2. Wood blocking and nailers.
  - 3. Wood furring.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of process and factory-fabricated product.
  - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.
- B. Evaluation Reports: For the following, from ICC-ES:
  - 1. Wood-preservative-treated wood.
  - 2. Engineered wood products.
  - 3. Shear panels.
  - 4. Power-driven fasteners.
  - 5. Powder-actuated fasteners.
  - 6. Expansion anchors.
  - 7. Metal framing anchors.

### **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. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
  - 3. Provide dressed lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.
- C. Engineered Wood Products: Provide engineered wood products acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
  - 1. Allowable Design Stresses: Provide engineered wood products with allowable design stresses, as published by manufacturer that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

#### **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, stripping, 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.
  4. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
  5. Wood floor plates that are installed over concrete slabs-on-grade.

### **2.3 DIMENSION LUMBER FRAMING**

- A. Non-Load-Bearing Interior Partitions: Construction or No. 2 grade.
  1. Application: All interior partitions.
  2. Species:
    - a. Western woods; WCLIB or WWPA.
- B. Framing Other Than Non-Load-Bearing Interior Partitions: No. 2 grade.
  1. Application: Framing other than interior partitions.
  2. Species:
    - a. Douglas fir-larch; WCLIB or WWPA.

### **2.4 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. Furring.
  4. Grounds.
- B. For items of dimension lumber size, provide Construction or No. 2 grade lumber of any species.
- C. For concealed boards, provide lumber with 19 percent maximum moisture content and the following species and grades:
  1. Western woods; Construction or No. 2 Common grade; WCLIB or WWPA.

### **2.5 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. Power-Driven Fasteners: NES NER-272.
- C. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

### **2.6 METAL FRAMING ANCHORS**

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

- B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
  - 1. Cleveland Steel Specialty Co.
  - 2. KC Metals Products, Inc.
  - 3. Phoenix Metal Products, Inc.
  - 4. Simpson Strong-Tie Co., Inc.
  - 5. USP Structural Connectors.
- C. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.
  - 1. Use for interior locations unless otherwise indicated.
- D. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.
  - 1. Use for wood-preserved-treated lumber and where indicated.

## 2.7 MISCELLANEOUS MATERIALS

- A. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.

## 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. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.
- D. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.
- E. Metal Framing Anchors: Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- F. Do not splice structural members between supports unless otherwise indicated.
- G. Comply with AWWA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
- H. Where wood-preserved-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.
- 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.

**END OF SECTION 06 1000**



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## **SECTION 06 1600 - SHEATHING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Wall sheathing.
  - 2. Roof sheathing.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
  - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements.
  - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Evaluation Reports: For following products, from ICC-ES:
  - 1. Preservative-treated plywood.
  - 2. Fire-retardant-treated plywood.

### **PART 2 - PRODUCTS**

#### **2.1 WOOD PANEL PRODUCTS**

- A. Plywood: Either DOC PS 1 or DOC PS 2 unless otherwise indicated.
- B. Oriented Strand Board: DOC PS 2.

#### **2.2 WALL SHEATHING**

- A. Plywood Wall Sheathing: Exposure 1 sheathing.
- B. Oriented-Strand-Board Wall Sheathing: Exposure 1 sheathing.

#### **2.3 ROOF SHEATHING**

- A. Plywood Roof Sheathing: Exposure 1 sheathing.
- B. Oriented-Strand-Board Roof Sheathing: Exposure 1 sheathing.

#### **2.4 FASTENERS**

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
  - 1. For roof and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION, GENERAL**

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by 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."
- D. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

### **3.2 WOOD STRUCTURAL PANEL INSTALLATION**

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
  - 1. Wall and Roof Sheathing:
    - a. Nail to wood framing. Apply a continuous bead of glue to framing members at edges of wall sheathing panels.
    - b. Space panels 1/8 inch apart at edges and ends.

**END OF SECTION 06 1600**

## **SECTION 06 1753 - SHOP-FABRICATED WOOD TRUSSES**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Wood roof trusses.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For metal-plate connectors, metal truss accessories, and fasteners.
- B. Shop Drawings: Show fabrication and installation details for trusses.
  - 1. Show location, pitch, span, camber, configuration, and spacing for each type of truss required.
  - 2. Indicate sizes, stress grades, and species of lumber.
  - 3. Indicate locations of permanent bracing required to prevent buckling of individual truss members due to design loads.
  - 4. Indicate locations, sizes, and materials for permanent bracing required to prevent buckling of individual truss members due to design loads.
  - 5. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
  - 6. Show splice details and bearing details.
- C. Delegated-Design Submittal: For metal-plate-connected wood trusses indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Product Certificates: For metal-plate-connected wood trusses, signed by officer of truss-fabricating firm.
- B. Evaluation Reports: For the following, from ICC-ES:
  - 1. Metal-plate connectors.
  - 2. Metal truss accessories.

#### **1.4 QUALITY ASSURANCE**

- A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.
  - 1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
  - 2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

#### **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Handle and store trusses to comply with recommendations in SBCA BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."

### **PART 2 - PRODUCTS**

#### **2.1 PERFORMANCE REQUIREMENTS**

- A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 4000 "Quality Requirements," to design metal-plate-connected wood trusses.

- B. Structural Performance: Metal-plate-connected wood trusses shall be capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1.
- C. Comply with applicable requirements and recommendations of TPI 1, TPI DSB, and SBCA BCSI.
- D. Wood Structural Design Standard: Comply with applicable requirements in AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."

## 2.2 DIMENSION LUMBER

- A. Lumber: DOC PS 20 and applicable rules of any rules-writing agency certified by the American Lumber Standard Committee (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. Provide dry lumber with 19 percent maximum moisture content at time of dressing.
- B. Permanent Bracing: Provide wood bracing that complies with requirements for miscellaneous lumber in Section 06 1000 "Rough Carpentry."

## 2.3 METAL CONNECTOR PLATES

- A. General: Fabricate connector plates to comply with TPI 1.
- B. Hot-Dip Galvanized-Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 coating designation; and not less than 0.036 inch thick.

## 2.4 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
  - 1. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.
  - 2. Where trusses are exposed to weather, in ground contact, 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.

## 2.5 METAL FRAMING ANCHORS AND ACCESSORIES

- 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. Cleveland Steel Specialty Co.
  - 2. KC Metals Products, Inc.
  - 3. Phoenix Metal Products, Inc.
  - 4. Simpson Strong-Tie Co., Inc.
  - 5. USP Structural Connectors.
- B. Allowable design loads, as published by manufacturer, shall comply with or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.
- C. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

## **2.6 FABRICATION**

- A. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly, with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.
  - 1. Fabricate wood trusses within manufacturing tolerances in TPI 1.
- B. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Install wood trusses only after supporting construction is in place and is braced and secured.
- B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.
- C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.
- D. Install and brace trusses according to TPI recommendations and as indicated.
- E. Anchor trusses securely at bearing points; use metal truss tie-downs or floor truss hangers as applicable. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.
- F. Securely connect each truss ply required for forming built-up girder trusses.
- G. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.
  - 1. Install bracing to comply with Section 06 1000 "Rough Carpentry."
  - 2. Install and fasten strongback bracing vertically against vertical web of parallel-chord floor trusses at centers indicated.
- H. Install wood trusses within installation tolerances in TPI 1.
- I. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.
- J. Replace wood trusses that are damaged or do not comply with requirements.

**END OF SECTION 06 1753**

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## **SECTION 06 2023 - INTERIOR FINISH CARPENTRY**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Interior trim.
  - 2. Installation of building specialties and hardware.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of process and factory-fabricated product.

### **PART 2 - PRODUCTS**

#### **2.1 MATERIALS, GENERAL**

- A. Lumber: DOC PS 20.
  - 1. Factory mark each piece of lumber with grade stamp of inspection agency indicating grade, species, moisture content at time of surfacing, and mill.
    - a. 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.
- B. Oriented-Strand-Board Wall Sheathing: Exposure 1 sheathing.
- C. High Density Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.

#### **2.2 MISCELLANEOUS MATERIALS**

- A. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.
  - 1. Wood glue shall have a VOC content of 30 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

### **PART 3 - EXECUTION**

#### **3.1 PREPARATION**

- A. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours unless longer conditioning is recommended by manufacturer.

#### **3.2 INSTALLATION, GENERAL**

- A. 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. 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 maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.

**END OF SECTION 06 2023**



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## **SECTION 06 6400 - PLASTIC PANELING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes glass-fiber reinforced plastic (FRP) wall paneling and trim accessories.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Samples: For each exposed product and for each color and texture specified.

#### **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. Flame-Spread Index: 25 or less.
  - 2. Smoke-Developed Index: 450 or less.

### **PART 2 - PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Kemlite Company Inc.
  - 2. Marlite.
  - 3. Nudo Products, Inc.

#### **2.2 PLASTIC SHEET PANELING**

- A. General: Gelcoat-finished, glass-fiber reinforced plastic panels complying with ASTM D 5319.
- B. Nominal Thickness: Not less than 0.09 inch.
- C. Surface Finish: Molded pebble texture.
- D. Color: As selected by Architect from manufacturer's full range.

#### **2.3 ACCESSORIES**

- A. Trim Accessories: Manufacturer's standard one-piece vinyl extrusions designed to retain and cover edges of panels. Provide division bars, inside corners, and caps as needed to conceal edges.
  - 1. Color: Match panels.
- B. Adhesive: As recommended by plastic paneling manufacturer.
- C. Sealant: Single-component, mildew-resistant, neutral-curing silicone sealant recommended by plastic paneling manufacturer and complying with requirements in Division 07 Section "Joint Sealants."

### **PART 3 - EXECUTION**

#### **3.1 PREPARATION**

- A. Clean substrates of substances that could impair bond of adhesive, including oil, grease, dirt, and dust.

- B. Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.
- C. Lay out paneling before installing. Locate panel joints to provide equal panels at ends of walls not less than half the width of full panels.

### **3.2 INSTALLATION**

- A. Install plastic paneling according to manufacturer's written instructions.
- B. Install panels in a full spread of adhesive.
- C. Install trim accessories with adhesive. Do not fasten through panels.
- D. Fill grooves in trim accessories with sealant before installing panels and bed inside corner trim in a bead of sealant.
- E. Maintain uniform space between panels and wall fixtures. Fill space with sealant.
- F. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.

**END OF SECTION 06 6400**

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## **SECTION 07 1113 - BITUMINOUS DAMPPROOFING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes cold-applied, emulsified-asphalt dampproofing.

#### **1.2 ACTION SUBMITTALS**

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

### **PART 2 - PRODUCTS**

#### **2.1 MATERIALS, GENERAL**

- A. VOC Content: Products shall comply with VOC content limits of authorities having jurisdiction unless otherwise required.

#### **2.2 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING**

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

1. BASF Construction Chemicals - Building Systems; Sonneborn Brand Products.
2. ChemMasters, Inc.
3. Euclid Chemical Company (The); an RPM company.
4. Henry Company.
5. Karnak Corporation.
6. Koppers Inc.
7. Malarkey Roofing Products.
8. Meadows, W. R., Inc.

- B. Brush and Spray Coats: ASTM D 1227, Type III, Class 1.

#### **2.3 AUXILIARY MATERIALS**

- A. General: Furnish auxiliary materials recommended in writing by dampproofing manufacturer for intended use and compatible with bituminous dampproofing.
- B. Emulsified-Asphalt Primer: ASTM D 1227, Type III, Class 1, except diluted with water as recommended in writing by manufacturer.

### **PART 3 - EXECUTION**

#### **3.1 APPLICATION, GENERAL**

- A. Comply with manufacturer's written instructions for substrate preparation, dampproofing application, cure time between coats, and drying time before backfilling unless more stringent requirements are indicated.
  1. Apply dampproofing to provide continuous plane of protection.
  2. Apply additional coats if recommended in writing by manufacturer or to achieve a smooth surface and uninterrupted coverage.
- B. Where dampproofing footings and foundation walls, apply from finished-grade line to top of footing; extend over top of footing and down a minimum of 6 inches over outside face of footing.
  1. Extend dampproofing 12 inches onto intersecting walls and footings, but do not extend onto surfaces exposed to view when Project is completed.
  2. Install flashings and corner protection stripping at internal and external corners, changes in plane, construction joints, cracks, and where shown as "reinforced," by embedding an 8-inch-wide strip of asphalt-

coated glass fabric in a heavy coat of dampproofing. Dampproofing coat for embedding fabric is in addition to other coats required.

**3.2 COLD-APPLIED, EMULSIFIED-ASPHALT DAMPPROOFING**

- A. Concrete Foundations: Apply two brush or spray coats at not less than 1.5 gal./100 sq. ft. for first coat and 1 gal./100 sq. ft. for second coat.

**END OF SECTION 07 1113**

## SECTION 07 2100 - THERMAL INSULATION

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Glass-fiber blanket.
  - 2. Polystyrene board insulation.

#### 1.2 ACTION SUBMITTALS

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

### PART 2 - PRODUCTS

#### 2.1 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD

- A. Extruded polystyrene boards in this article are also called "XPS boards."
- B. Extruded Polystyrene Board, Type IV: ASTM C 578, Type IV, 25-psi minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E 84.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. DiversiFoam Products.
    - b. Dow Chemical Company (The).
    - c. Owens Corning.

#### 2.2 GLASS-FIBER BLANKET

- A. Glass-Fiber Blanket, Unfaced: 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, provide products by one of the following:
    - a. CertainTeed Corporation.
    - b. Johns Manville; a Berkshire Hathaway company.
    - c. Owens Corning.
- B. Glass-Fiber Blanket, Polypropylene-Scrim-Kraft Faced: ASTM C 665, Type II (nonreflective faced), Class A (faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier).
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. CertainTeed Corporation.
    - b. Johns Manville; a Berkshire Hathaway company.
    - c. Owens Corning.

#### 2.3 ACCESSORIES

- A. Insulation for Miscellaneous Voids:
  - 1. Glass-Fiber Insulation: ASTM C 764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E 84.
  - 2. Spray Polyurethane Foam Insulation: ASTM C 1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
- B. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide ventilation between insulated attic spaces and vented eaves.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION, GENERAL**

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

### **3.2 INSTALLATION OF SLAB INSULATION**

- A. On vertical slab edge and foundation surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.

### **3.3 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION**

- A. 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 (76-mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
  - 4. Attics: Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
  - 5. For wood-framed construction, install blankets according to ASTM C 1320 and as follows:
    - a. 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.
  - 6. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings, and seal each continuous area of insulation to ensure airtight installation.
    - a. Exterior Walls: Set units with facing placed toward interior of construction.
    - b. Interior Walls: Set units with facing placed toward areas of high humidity.
- B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
  - 1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft.
  - 2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

**END OF SECTION 07 2100**



## **SECTION 07 2500 - WEATHER BARRIERS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Building wrap.

#### **1.2 ACTION SUBMITTALS**

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

### **PART 2 - PRODUCTS**

#### **2.1 WATER-RESISTIVE BARRIER**

- A. Building Wrap: ASTM E 1677, Type I air barrier; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E 84; UV stabilized; and acceptable to authorities having jurisdiction.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Dow Chemical Company (The); Styrofoam Weathermate Plus Brand Housewrap.
    - b. DuPont (E. I. du Pont de Nemours and Company); Tyvek CommercialWrap.
    - c. Raven Industries Inc.; Fortress Pro Weather Protective Barrier.
    - d. Reemay, Inc.; Typar HouseWrap.
  - 2. Water-Vapor Permeance: Not less than 50 g through 1 sq. m of surface in 24 hours per ASTM E 96/E 96M, Desiccant Method (Procedure A).
- B. Building-Wrap Tape: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap.

### **PART 3 - EXECUTION**

#### **3.1 WATER-RESISTIVE BARRIER INSTALLATION**

- A. Cover sheathing with water-resistive barrier as follows:
  - 1. Cut back barrier 1/2 inch on each side of the break in supporting members at expansion- or control-joint locations.
  - 2. Apply barrier to cover vertical flashing with a minimum 4-inch overlap unless otherwise indicated.
- B. Building Wrap: Comply with manufacturer's written instructions.
  - 1. Seal seams, edges, fasteners, and penetrations with tape.
  - 2. Extend into jambs of openings and seal corners with tape.

**END OF SECTION 07 2500**

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## **SECTION 07 4113.16 - STANDING-SEAM METAL ROOF PANELS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes standing-seam metal roof panels.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
- C. Samples: For each type of metal panel indicated.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Product test reports.
- B. Warranties: Sample of special warranties.

#### **1.4 CLOSEOUT SUBMITTALS**

- A. Maintenance data.

#### **1.5 QUALITY ASSURANCE**

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.

#### **1.6 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Finish Warranty Period: 20 years from date of Substantial Completion.

### **PART 2 - PRODUCTS**

#### **2.1 PERFORMANCE REQUIREMENTS**

- A. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 1646 at the following test-pressure difference:
  - 1. Test-Pressure Difference: 6.24 lbf/sq. ft..
- B. Hydrostatic-Head Resistance: No water penetration when tested according to ASTM E 2140.

- C. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.
  - 1. Uplift Rating: UL 90.
- D. FM Global Listing: Provide metal roof panels and component materials that comply with requirements in FM Global 4471 as part of a panel roofing system and that are listed in FM Global's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Global markings.
  - 1. Fire/Windstorm Classification: Class 1A- 90.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

## 2.2 STANDING-SEAM METAL ROOF PANELS

- A. General: Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.
  - 1. Steel Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E 1514.
- B. Vertical-Rib, Seamed-Joint, Curved Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and smooth striated pan between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels, engaging opposite edge of adjacent panels, and mechanically seaming panels together.
  - 1. Basis of Design Product: Subject to compliance with requirements, provide products by the following:
    - a. BattenLok by MBCI; a division of NCI Group, Inc.
  - 2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
    - a. Nominal Thickness: 0.028 inch.
    - b. Exterior Finish: Two-coat fluoropolymer.
    - c. Color: As selected by Architect from manufacturer's full range.
  - 3. Clips: Two-piece floating to accommodate thermal movement.
    - a. Material: 0.064-inch-nominal thickness, zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet.
  - 4. Joint Type: As standard with manufacturer.
  - 5. Panel Coverage: 16 inches.
  - 6. Panel Height: 2.0 inches.

## 2.3 UNDERLAYMENT MATERIALS

- A. Felt Underlayment: ASTM D 226/D 22M, Type II (No. 30), asphalt-saturated organic felts.
- B. Self-Adhering Sheet Underlayment, Polyethylene Faced (Ice & Water Shield): ASTM D 1970/D 1970M, minimum of 40-mil-thick, slip-resisting, polyethylene-film-reinforced top surface laminated to SBS-modified asphalt adhesive, with release backing; cold applied.

## 2.4 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C 645; cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 coating designation or ASTM A 792/A 792M, Class AZ50 coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.

1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
  2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
  3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- D. Gutters and Downspouts: Formed from same material as roof panels according to SMACNA's "Architectural Sheet Metal Manual." Finish to match roof fascia and rake trim.
- E. Panel Fasteners: Self-tapping screws designed to withstand design loads.
- F. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing; 1/2 inch wide and 1/8 inch thick.
  2. Joint Sealant: ASTM C 920; as recommended in writing by metal panel manufacturer.
  3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

## 2.5 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.
- C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- D. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

## 2.6 FINISHES

- A. Panels and Accessories:
1. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat.
  2. Concealed Finish: White or light-colored acrylic or polyester backer finish.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

### **3.2 UNDERLAYMENT INSTALLATION**

- A. Felt Underlayment: Apply at locations indicated below, in shingle fashion to shed water, and with lapped joints of not less than 2 inches.
  - 1. Apply over the entire roof surface.
- B. Self-Adhering Sheet Underlayment: Install, wrinkle free, on roof deck. Comply with low-temperature installation restrictions of underlayment manufacturer if applicable. Install lapped in direction that sheds water. Lap sides not less than 3-1/2 inches. Lap ends not less than 6 inches staggered 24 inches between courses. Roll laps with roller. Cover underlayment within seven days.
- C. Flashings: Install flashings to cover underlayment to comply with requirements specified in Section 076200 "Sheet Metal Flashing and Trim."

### **3.3 METAL PANEL INSTALLATION**

- A. Standing-Seam Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.
  - 1. Install clips to supports with self-tapping fasteners.
  - 2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
  - 3. Snap Joint: Nest standing seams and fasten together by interlocking and completely engaging factory-applied sealant.
  - 4. Watertight Installation:
    - a. Apply a continuous ribbon of sealant or tape to seal joints of metal panels, using sealant or tape as recommend in writing by manufacturer as needed to make panels watertight.
    - b. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
    - c. At panel splices, nest panels with minimum 6-inch end lap, sealed with sealant and fastened together by interlocking clamping plates.
- B. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
- C. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

### **3.4 CLEANING AND PROTECTION**

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

**END OF SECTION 07 4113.16**

## **SECTION 07 4213.53 - METAL SOFFIT PANELS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes metal soffit panels.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
- C. Samples: For each type of metal panel indicated.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Product test reports.
- B. Warranties: Samples of special warranties.

#### **1.4 CLOSEOUT SUBMITTALS**

- A. Maintenance data.

#### **1.5 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Finish Warranty Period: 20 years from date of Substantial Completion.

### **PART 2 - PRODUCTS**

#### **2.1 PERFORMANCE REQUIREMENTS**

- A. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

#### **2.2 METAL SOFFIT PANELS**

- A. General: Provide metal soffit panels designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation.
- B. V-Groove-Profile Metal Soffit Panels: Perforated panels formed with vertical panel edges and a flat pan between panel edges; with a V-groove joint between panels.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. ATAS International, Inc.
    - b. Berridge Manufacturing Company.

- c. Dimensional Metals, Inc.
  - d. Englert, Inc.
  - e. Fabral.
  - f. Innovative Metals Company, Inc.
  - g. McElroy Metal, Inc.
  - h. Petersen Aluminum Corporation.
1. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
    - a. Nominal Thickness: 0.022 inch (0.56 mm).
    - b. Exterior Finish: Two-coat fluoropolymer.
    - c. Color: As selected by Architect from manufacturer's full range.
  2. Panel Coverage: 12 inches.
  3. Panel Height: 0.50 inch.

## 2.3 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 coating designation or ASTM A 792/A 792M, Class AZ50 aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
  1. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Finish flashing and trim with same finish system as adjacent metal panels.
- D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.
- E. Panel Sealants: Provide sealant types recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
  1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing; 1/8 inch thick.
  2. Joint Sealant: ASTM C 920; as recommended in writing by metal panel manufacturer.
  3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

## 2.4 FABRICATION

- A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.
- C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- D. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.



- E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

## **2.5 FINISHES**

- A. Panels and Accessories:
  - 1. Two-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - 2. Concealed Finish: White or light-colored acrylic or polyester backer finish.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.
  - 1. Soffit Framing: Wire tie or clip furring channels to supports, as required to comply with requirements for assemblies indicated.

### **3.2 METAL PANEL INSTALLATION**

- A. Metal Soffit Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.
  - 1. Apply panels and associated items true to line for neat and weathertight enclosure.
  - 2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
  - 3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
  - 4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
- B. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
- C. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.

### **3.3 CLEANING**

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

**END OF SECTION 07 4213.53**

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## **SECTION 07 4620 - STEEL SIDING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes steel siding.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Samples: For aluminum siding including related accessories.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Product certificates.
- B. Research/evaluation reports.
- C. Sample warranty.

#### **1.4 CLOSEOUT SUBMITTALS**

- A. Maintenance data.

#### **1.5 WARRANTY**

- A. Special Warranty: Manufacturer agrees to repair or replace products that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: Lifetime from date of Substantial Completion.

### **PART 2 - PRODUCTS**

#### **2.1 STEEL SIDING**

- A. Steel Siding: Formed and coated product complying with AZ-50.
  - 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. Gentek Building Products, Inc.
    - b. Mastic Home Exteriors; PLY GEM Siding Group.
    - c. Rollex Corporation.
    - d. Equal as approved by Architect prior to bidding.
- B. Horizontal Pattern: 8-inch exposure in plain, single-board style.
- C. Texture: Wood grain.
- D. Nominal Thickness: 0.017 inch.
- E. Insulation: Manufacturer's standard integral insulation panels.
- F. Finish: Manufacturer's standard three-coat PVDF.
  - 1. Colors: As selected by Architect from manufacturer's full range of colors.

## **2.2 ACCESSORIES**

- A. Siding Accessories, General: Provide starter strips, edge trim, outside and inside corner caps, and other items as recommended by siding manufacturer for building configuration.
  - 1. Provide accessories made from same material as adjacent siding unless otherwise indicated.
- B. Steel Accessories: Where steel accessories are indicated, provide accessories complying with AZ-50.
  - 1. Texture: Wood grain.
  - 2. Nominal Thickness: 0.017 inch.
  - 3. Finish: Manufacturer's standard three-coat PVDF.
- C. Colors for Decorative Accessories: As selected by Architect from manufacturer's full range of colors.
- D. Flashing: Provide flashing complying with Section 07 6200 "Sheet Metal Flashing and Trim" at window and door heads and where indicated.
  - 1. Finish for Steel Flashing: Same as steel siding.
- E. Fasteners:
  - 1. For fastening to wood, use ribbed bugle-head screws of sufficient length to penetrate a minimum of 1 inch into substrate.
  - 2. Where fasteners are exposed to view, use prefinished fasteners in color to match item being fastened.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. General: Comply with manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.
  - 1. Center nails in elongated nailing slots without binding siding to allow for thermal movement.
- B. Install aluminum siding and related accessories according to AAMA 1406.
  - 1. Install fasteners no more than 24 inches o.c.
- C. Install joint sealants as specified in Section 07 9200 "Joint Sealants" and to produce a weathertight installation.
- D. Where siding contacts dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufacturer for this purpose.

### **3.2 ADJUSTING AND CLEANING**

- A. Remove damaged, improperly installed, or otherwise defective materials and replace with new materials complying with specified requirements.
- B. Clean finished surfaces according to manufacturer's written instructions and maintain in a clean condition during construction.

## **END OF SECTION 07 4620**

## **SECTION 07 6200 - SHEET METAL FLASHING AND TRIM**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Sheet metal fascia.
  - 2. Formed steep-slope roof sheet metal fabrications.
  - 3. Formed wall sheet metal fabrications.
  - 4. Formed roof-drainage sheet metal fabrications.
  - 5. Miscellaneous sheet metal fabrications.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: For sheet metal flashing and trim.
  - 1. Include plans, elevations, sections, and attachment details.
  - 2. Distinguish between shop- and field-assembled work.
  - 3. Include identification of finish for each item.
  - 4. Include pattern of seams and details of termination points, expansion joints and expansion-joint covers, direction of expansion, roof-penetration flashing, and connections to adjoining work.
- C. Samples: For each exposed product and for each color and texture specified.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Product certificates.
- B. Product test reports.
- C. Sample warranty.

#### **1.4 CLOSEOUT SUBMITTALS**

- A. Maintenance data.

#### **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 WARRANTY**

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Finish Warranty Period: 20 years from date of Substantial Completion.

### **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 SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
  - 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. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, G90 coating designation; prepainted by coil-coating process to comply with ASTM A 755/A 755M.
  - 1. Exposed Coil-Coated Finish:
    - a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
  - 2. Color: As selected by Architect from manufacturer's full range.
- C. Lead Sheet: ASTM B 749, Type L51121, copper-bearing lead sheet.
- D. Zinc Sheet: Electrolytic, 99 percent pure zinc alloyed with 1 percent titanium and copper.
  - 1. Finish: Bright rolled.

## 2.3 UNDERLAYMENT MATERIALS

- A. Felt: ASTM D 226/D 226M, Type II (No. 30), asphalt-saturated organic felt; nonperforated.
- B. Synthetic Underlayment: Laminated or reinforced, woven polyethylene or polypropylene, synthetic roofing underlayment; bitumen free; slip resistant; suitable for high temperatures over 220 deg F; and complying with physical requirements of ASTM D 226/D 226M for Type I and Type II felts.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Atlas Roofing Corporation; Summit.
    - b. Engineered Coated Products; Nova-Seal II.
    - c. Kirsch Building Products, LLC; Sharkskin Comp.
    - d. SDP Advanced Polymer Products Inc; Palisade.
- C. 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. Products: Subject to compliance with requirements, provide one of the following:
    - a. Carlisle Residential, a division of Carlisle Construction Materials; WIP 300HT.
    - b. Grace Construction Products, a unit of W. R. Grace & Co.-Conn.; Grace Ice and Water Shield HT.
    - c. Henry Company; Blueskin PE200 HT.
    - d. Kirsch Building Products, LLC; Sharkskin Ultra SA.
    - e. Metal-Fab Manufacturing, LLC; MetShield.
    - f. Owens Corning; WeatherLock Specialty Tile & Metal Underlayment.
    - g. Polyguard Products, Inc.; Deck Guard HT.
    - h. Protecto Wrap Company; Protecto Jiffy Seal Ice & Water Guard HT.
    - i. SDP Advanced Polymer Products Inc; Palisade SA-HT.
  - 2. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F or higher.
  - 3. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F or lower.
- D. 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 or manufactured item.
  - 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 Zinc-Coated (Galvanized) 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 Zinc-Coated (Galvanized) Steel: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead.
- D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
- E. Elastomeric Sealant: ASTM C 920, elastomeric silicone 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. Obtain field measurements for accurate fit before shop fabrication.
  - 2. 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.
  - 3. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. 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.
- C. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
- D. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- E. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.

- F. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Sds~Rivet joints where necessary for strength.

## **2.6 STEEP-SLOPE ROOF SHEET METAL FABRICATIONS**

- A. Apron, Step, Cricket, and Backer Flashing: Fabricate from the following materials:
1. Galvanized Steel: 0.022 inch thick.
- B. Drip Edges: Fabricate from the following materials:
1. Galvanized Steel: 0.022 inch thick.
- C. Eave, Rake Flashing: Fabricate from the following materials:
1. Galvanized Steel: 0.022 inch thick.

## **2.7 WALL SHEET METAL FABRICATIONS**

- A. Opening Flashings in Frame Construction: Fabricate head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings. Form head and sill flashing with 2-inch-high, end dams. Fabricate from the following materials:
1. Prefinished Galvanized Steel: 0.028 inch thick (24 ga.).

## **2.8 ROOF-DRAINAGE SHEET METAL FABRICATIONS**

- A. Hanging Gutters: Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch-long sections. Furnish flat-stock gutter brackets and gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard but with thickness not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters.
1. Prefinished Galvanized Steel: 0.028 inch thick (24 ga.).
- B. Downspouts: Fabricate rectangular open-face downspouts to dimensions indicated, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors.
1. Prefinished Galvanized Steel: 0.028 inch thick (24 ga.).

## **2.9 MISCELLANEOUS SHEET METAL FABRICATIONS**

- A. Miscellaneous and equipment support flashings: Fabricate from the following material:
1. Galvanized Steel: 0.034 inch thick (22 ga.).

# **PART 3 - EXECUTION**

## **3.1 UNDERLAYMENT INSTALLATION**

- A. Felt Underlayment: Install felt underlayment, wrinkle free, using adhesive to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.
- B. Synthetic Underlayment: Install synthetic underlayment, wrinkle free, according to manufacturers' written instructions, and using adhesive where possible to minimize use of mechanical fasteners under sheet metal.
- C. 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 14 days.



### 3.2 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, solder, 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 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.
- 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 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.
  - 2. Use lapped expansion joints only where indicated on Drawings.
- D. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- 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.

### 3.3 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. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate.
- C. 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.
- D. 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.
- E. 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.

### **3.4 WALL FLASHING INSTALLATION**

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Opening Flashings in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings.

### **3.5 MISCELLANEOUS FLASHING INSTALLATION**

- A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

### **3.6 CLEANING AND PROTECTION**

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean off excess sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.

**END OF SECTION 07 6200**

## **SECTION 07 9200 - JOINT SEALANTS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Silicone joint sealants.
  - 2. Urethane joint sealants.
  - 3. Latex joint sealants.

#### **1.2 PRECONSTRUCTION TESTING**

- A. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers eight samples of materials that will contact or affect joint sealants. Use manufacturer's standard test method to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
  - 1. Testing will not be required if joint sealant manufacturers submit joint preparation data that are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.
- B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates. 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.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For each joint-sealant product indicated.
- B. Samples: For each kind and color of joint sealant required.
- 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.

#### **1.4 INFORMATIONAL SUBMITTALS**

- A. Product test reports.
- B. Preconstruction compatibility and adhesion test reports.
- C. Preconstruction field-adhesion test reports.
- D. Field-adhesion test reports.
- E. Warranties.

#### **1.5 QUALITY ASSURANCE**

- A. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.
- B. Preinstallation Conference: Conduct conference at Project site.

## 1.6 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: Three years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MATERIALS, GENERAL

- A. 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 deionized water, unless otherwise indicated.
- B. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

### 2.2 SILICONE JOINT SEALANTS

- A. Neutral-Curing Silicone Joint Sealant: ASTM C 920.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. BASF Building Systems, Sonneborn, Sonolastic 150.
    - b. Dow Corning Corporation, 791.
    - c. Polymeric Systems, Inc., PSI-631
    - d. Tremco Incorporated, Spectrem 2.
  2. Type: Single component (S).
  3. Grade: nonsag (NS).
  4. Class: 25.
  5. Uses Related to Exposure: Nontraffic (NT).
- B. Mildew-Resistant Silicone Joint Sealant: ASTM C 920.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. BASF Building Systems, Sonneborn, Omniplus or Sonolastic 150.
    - b. Dow Corning Corporation, 786 Mildew Resistant.
    - c. GE Advanced Materials - Silicones, Sanitary 1700.
    - d. Tremco Incorporated, Tremsil 600 White.
  2. Type: Single component (S).
  3. Grade: nonsag (NS).
  4. Class: 25.
- C. Uses Related to Exposure: Nontraffic (NT).

### 2.3 URETHANE JOINT SEALANTS

- A. Multi-Component Pourable Urethane Joint Sealant: ASTM C 920.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. BASF Building Systems, Sonneborn, NP1.
    - b. Mameco International, Vulkem 245.
    - c. Pecora Corporation, Dynatrol I.
    - d. Tremco Incorporated, DyMonic.
  2. Type: Single-component (S).
  3. Grade: Nonsag (NS).
  4. Class: 25.
  5. Uses Related to Exposure: Traffic (T) and Nontraffic (NT).

- B. Single-Component Nonsag Urethane Joint Sealant: ASTM C 920.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. BASF Building Systems, Sonneborn, ChemRex, Inc., SL2.
    - b. Mameco International, Vulkem 921.
    - c. Pacific Polymers International, Inc., Elasto-Thane 920 Pourable.
    - d. Sika Corporation; Construction Products Division, Sikaflex – 2c SL.
  - 2. Type: multicomponent (M).
  - 3. Grade: Pourable (P).
  - 4. Class: 25.
  - 5. Uses Related to Exposure: Traffic (T) and Nontraffic (NT).

## **2.4 LATEX JOINT SEALANTS**

- A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. BASF Building Systems, Sonneborn, ChemRex, Inc., Sonolac.
    - b. Pecora Corporation, AC-20.
    - c. Tremco Incorporated, Tremflex 834.

## **2.5 JOINT SEALANT BACKING**

- A. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), Type O (open-cell material), Type B (bicellular 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.
- B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

## **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 Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

# **PART 3 - EXECUTION**

## **3.1 PREPARATION**

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.
  - 1. Remove laitance and form-release agents from concrete.
  - 2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
- B. 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.
- C. 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.

### **3.2 INSTALLATION**

- A. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- B. 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.
- C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- D. 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.
- E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
  - 1. Remove excess sealant from surfaces adjacent to joints.
  - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
  - 3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.
- F. 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.

### **3.3 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 10 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
    - b. Perform 1 test for each 1000 feet of joint length thereafter or 1 test per each floor per elevation.
  - 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.
- 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.

### **3.4 JOINT-SEALANT SCHEDULE**

- A. Joint-Sealant Application: Exterior and interior joints in horizontal traffic surfaces.
  - 1. Joint Locations:
    - a. Isolation and contraction joints in cast-in-place concrete slabs.
    - b. Tile control and expansion joints.
    - c. Joints between different materials listed above.
    - d. Other joints as indicated.
  - 2. Joint Sealant: Multi-Component Pourable Urethane.
  - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
  - 1. Joint Locations:
    - a. Construction joints in cast-in-place concrete.

- b. Other joints as indicated.
  - 2. Joint Sealant: Single-Component Nonsag Urethane.
  - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Joint-Sealant Application: Interior joints in field-painted vertical surfaces and horizontal nontraffic surfaces.
  - 1. Joint Locations:
    - a. Control and expansion joints on exposed interior surfaces of exterior walls.
    - b. Perimeter joints of exterior openings where indicated.
    - c. Vertical joints on exposed surfaces of interior unit masonry, concrete, walls and partitions.
    - d. Perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances.
    - e. Other joints as indicated.
  - 2. Joint Sealant: Latex.
  - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- D. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
  - 1. Joint Locations:
    - a. Control and expansion joints in unit masonry.
    - b. Joints in exterior insulation and finish systems.
    - c. Joints between metal panels.
    - d. Joints between different materials listed above.
    - e. Perimeter joints between materials listed above and frames of doors, windows and louvers.
    - f. Control and expansion joints in ceilings and other overhead surfaces.
    - g. Other joints as indicated.
  - 2. Joint Sealant: Neutral-Curing Silicone.
- E. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- F. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.
  - 1. Joint Sealant Location:
    - a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
    - b. Tile control and expansion joints where indicated.
    - c. Other joints as indicated.
  - 2. Joint Sealant: Mildew Resistant Silicone.
  - 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

**END OF SECTION 07 9200**

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## SECTION 08 1113 - HOLLOW METAL DOORS AND FRAMES

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes hollow-metal work.

#### 1.2 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include elevations, door edge details, frame profiles, metal thicknesses, preparations for hardware, and other details.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
- D. Samples for Verification: For each type of exposed finish required.
- E. Schedule: Prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Product test reports.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Amweld International, LLC.
  - 2. Ceco Door Products; an Assa Abloy Group company.
  - 3. Curries Company; an Assa Abloy Group company.
  - 4. Kewanee Corporation (The).
  - 5. Mesker Door Inc.
  - 6. Pioneer Industries, Inc.
  - 7. Republic Doors and Frames.
  - 8. Steelcraft; an Ingersoll-Rand company.

#### 2.2 INTERIOR DOORS AND FRAMES

- A. Heavy-Duty Doors and Frames: SDI A250.8, Level 2.
  - 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.
    - c. Face: Uncoated, cold-rolled steel sheet, minimum thickness of 0.042 inch.
    - d. Edge Construction: Model 2, Seamless.
    - e. Core: Manufacturer's standard.
  - 3. Frames:
    - a. Materials: Uncoated, steel sheet, minimum thickness of 0.053 inch.
    - b. Construction: Face welded.

4. Exposed Finish: Prime.

## **2.3 EXTERIOR HOLLOW-METAL DOORS AND FRAMES**

- A. Maximum Duty Doors and Frames: SDI A250.8, Level 4.
  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.
    - c. Face: Metallic-coated steel sheet, minimum thickness of 0.067 inch, with minimum A40 coating.
    - d. Edge Construction: Model 2, Seamless.
    - e. Core: Manufacturer's standard insulation material.
  3. 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 when tested according to ASTM C 1363.
  4. Frames:
    - a. Materials: Metallic-coated steel sheet, minimum thickness of 0.067 inch, with minimum A40 coating.
    - b. Construction: Face welded.
  5. Exposed Finish: Prime.

## **2.4 FRAME ANCHORS**

- A. Jamb Anchors:
  1. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch thick.
- B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch, and as follows:
  1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

## **2.5 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. Frame Anchors: ASTM A 879/A 879M, Commercial Steel (CS), 04Z 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.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- E. Power-Actuated Fasteners in Concrete: From corrosion-resistant materials.
- F. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing).
- G. Glazing: Section 08 8000 "Glazing."

## **2.6 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. 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.

- 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. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
      - 1) Three anchors per jamb up to 60 inches high.
      - 2) Four anchors per jamb from 60 to 90 inches high.
      - 3) Five anchors per jamb from 90 to 96 inches high.
      - 4) Five anchors per jamb plus one additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
    - b. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.
  - 4. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers.
    - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    - b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- D. 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 nontemplated, 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.

## 2.7 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
  - 1. Shop Primer: SDI A250.10.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. 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. 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.
    - b. Install frames with removable stops located on secure side of opening.
    - 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.
  - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
    - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
  - 3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation inside frames.
  - 4. In-Place Metal or Wood-Stud Partitions: Secure slip-on drywall frames in place according to manufacturer's written instructions.
  - 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, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.

- c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
  - B. 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 plus or minus 1/32 inch.
      - b. Between Edges of Pairs of Doors: 1/8 inch to 1/4 inch plus or minus 1/32 inch.
      - c. At Bottom of Door: 5/8 inch plus or minus 1/32 inch.
      - d. Between Door Face and Stop: 1/16 inch to 1/8 inch plus or minus 1/32 inch.

### **3.2 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. 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.
- C. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

**END OF SECTION 08 1113**

## **SECTION 08 3613 - SECTIONAL DOORS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes electrically operated sectional doors.
- B. Related Requirements:
  - 1. Section 05 5000 "Metal Fabrications" for miscellaneous steel supports.
  - 2. Section 08 7100 "Door Hardware" for locking cylinder.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type and size of sectional door and accessory.
- B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
- C. Samples: For each exposed product and for each color and texture specified.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Sample warranty.

#### **1.4 CLOSEOUT SUBMITTALS**

- A. Maintenance data.

#### **1.5 QUALITY ASSURANCE**

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

#### **1.6 WARRANTY**

- A. Special Warranty: Manufacturer agrees to repair or replace components of sectional doors that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Finish Warranty: Manufacturer agrees to repair or replace components that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Warranty Period: 10 years from date of Substantial Completion.

### **PART 2 - PRODUCTS**

#### **2.1 PERFORMANCE REQUIREMENTS**

- A. General Performance: Sectional doors shall comply with performance requirements specified without failure due to defective manufacture, fabrication, installation, or other defects in construction and without requiring temporary installation of reinforcing components.
- B. Structural Performance, Exterior Doors: Capable of withstanding the design wind loads.
  - 1. Design Wind Load: Uniform pressure (velocity pressure) of 20 lbf/sq. ft., acting inward and outward.
  - 2. Testing: According to ASTM E 330.
- C. Seismic Performance: Sectional doors shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

## 2.2 DOOR ASSEMBLY

- A. Steel Sectional Door: Sectional door formed with hinged sections and fabricated according to DASMA 102 unless otherwise indicated.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Overhead Door Thermacore 596 or comparable product by one of the following:
    - a. Clopay Building Products.
    - b. Martin Door Manufacturing.
    - c. Overhead Door Corporation.
    - d. Raynor.
    - e. Wayne-Dalton Corp.
    - f. Windsor Door.
- B. Operation Cycles: Door components and operators capable of operating for not less than 20,000.
- C. Air Infiltration: Maximum rate of 0.4 cfm/sq. ft. at 15 and 25 mph when tested according to ASTM E 283 or DASMA 105.
- D. R-Value: 17.5 deg F x h x sq. ft./Btu <Insert value>.
- E. Steel Sections: Zinc-coated (galvanized) steel sheet with G60 zinc coating.
  - 1. Section Thickness: 2 inches.
  - 2. Exterior-Face Surface: Flat.
  - 3. Interior Facing Material: manufacturer's standard material.
- F. Track Configuration: Standard-lift track.
- G. Weatherseals: Fitted to bottom and top and around entire perimeter of door.
- H. Locking Devices: Equip door with locking device assembly.
  - 1. Locking Device Assembly: Cremone type, both jamb sides, locking bars, operable from inside with thumbturn.
- I. Electric Door Operator:
  - 1. Usage Classification: Standard duty, up to 25 cycles per hour and up to 90 cycles per day.
  - 2. Operator Type: Manufacturer's standard for door requirements.
  - 3. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use; moving parts of operator enclosed or guarded if exposed and mounted at 8 feet or lower.
  - 4. Motor Exposure: Interior, clean, and dry.
  - 5. Emergency Manual Operation: Push-up type.
  - 6. Obstruction-Detection Device: Automatic photoelectric sensor.
  - 7. Control Station: Interior-side mounted.
- J. Door Finish:
  - 1. Baked-Enamel or Powder-Coat Finish: Color and gloss as selected by Architect from manufacturer's full range.
  - 2. Finish of Interior Facing Material: Finish as selected by Architect from manufacturer's full range.

## 2.3 STEEL DOOR SECTIONS

- A. Exterior Section Faces and Frames: Zinc-coated (galvanized), cold-rolled, commercial steel (CS) sheet.
  - 1. Roll horizontal meeting edges to a continuous, interlocking, keyed, rabbeted, shiplap, or tongue-in-groove weather-resistant seal, with a reinforcing flange return.
  - 2. For insulated doors, provide sections with continuous thermal-break construction, separating the exterior and interior faces of door.
- B. Section Ends and Intermediate Stiles: Enclose open ends of sections with channel end stiles formed from galvanized-steel sheet welded to door section. Provide intermediate stiles formed from galvanized-steel sheet, cut to door section profile, and welded in place. Space stiles not more than 48 inches apart.

- C. Reinforce bottom section with a continuous channel or angle conforming to bottom-section profile and allowing installation of astragal.
- D. Reinforce sections with continuous horizontal and diagonal reinforcement, as required to stiffen door and for wind loading. Provide galvanized-steel bars, struts, trusses, or strip steel, formed to depth and bolted or welded in place.
- E. Provide reinforcement for hardware attachment.
- F. Thermal Insulation: Insulate interior of steel sections with door manufacturer's standard CFC-free insulation, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E 84. Enclose insulation completely within steel sections and the interior facing material, with no exposed insulation.

## **2.4 TRACKS, SUPPORTS, AND ACCESSORIES**

- A. Tracks: Manufacturer's standard, galvanized-steel track system of configuration indicated, sized for door size and weight, designed for lift type indicated and clearances indicated on Drawings. Provide complete system including brackets, bracing, and reinforcement to ensure rigid support of ball-bearing roller guides for required door type, size, weight, and loading.
  - 1. Track Reinforcement and Supports: Galvanized-steel members to support track without sag, sway, and vibration during opening and closing of doors. Slot vertical sections of track spaced 2 inches apart for door-drop safety device.
- B. Weatherseals: Replaceable, adjustable, continuous, compressible weather-stripping gaskets of flexible vinyl, rubber, or neoprene fitted to bottom and top of sectional door unless otherwise indicated.

## **2.5 HARDWARE**

- A. General: Heavy-duty, corrosion-resistant hardware, with hot-dip galvanized, stainless-steel, or other corrosion-resistant fasteners, to suit door type.
- B. Hinges: Heavy-duty, galvanized-steel hinges at each end stile and at each intermediate stile, according to manufacturer's written recommendations for door size. Attach hinges to door sections through stiles and rails.
- C. Rollers: Heavy-duty rollers with steel ball-bearings in case-hardened steel races, mounted with varying projections to suit slope of track. Provide 3-inch-diameter roller tires for 3-inch-wide track and 2-inch-diameter roller tires for 2-inch-wide track.
- D. Push/Pull Handles: Equip each push-up operated or emergency-operated door with galvanized-steel lifting handles on each side of door, finished to match door.

## **2.6 LOCKING DEVICES**

- A. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded deadbolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.
  - 1. Lock Cylinders: Cylinders standard with manufacturer and keyed to building keying system.
  - 2. Keys: Two for each cylinder.
- B. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

## **2.7 COUNTERBALANCE MECHANISM**

- A. Torsion Spring: Counterbalance mechanism consisting of adjustable-tension torsion springs fabricated from steel-spring wire complying with ASTM A 229/A 229M, mounted on torsion shaft made of steel tube or solid steel. Provide springs designed for number of operation cycles indicated.
- B. Cable Drums and Shaft for Doors: Cast-aluminum or gray-iron casting cable drums mounted on torsion shaft and grooved to receive door-lifting cables as door is raised. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of torsion shaft.



- C. Cables: Galvanized-steel, multistrand, lifting cables.
- D. Cable Safety Device: Include a spring-loaded steel or spring-loaded bronze cam mounted to bottom door roller assembly on each side and designed to automatically stop door if either lifting cable breaks.
- E. Bracket: Provide anchor support bracket as required to connect stationary end of spring to the wall and to level the shaft and prevent sag.
- F. Bumper: Provide spring bumper at each horizontal track to cushion door at end of opening operation.

## 2.8 MANUAL DOOR OPERATORS

- A. General: Equip door with manual door operator by door manufacturer.
- B. Push-up Operation: Lift handles and pull rope for raising and lowering doors, with counterbalance mechanism designed so that required lift or pull for door operation does not exceed [25 lbf] <Insert value>.

## 2.9 ELECTRIC DOOR OPERATORS

- A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and "operation cycles" requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
  - 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. Chamberlain Group, Inc. (The).
  - 2. Comply with NFPA 70.
  - 3. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6; with NFPA 70, Class 2 control circuit, maximum 24-V ac or dc.
- B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.
- C. Door-Operator Type: Unit consisting of electric motor, gears, pulleys, belts, sprockets, chains, and controls needed to operate door and meet required usage classification.
- D. Motors: Reversible-type motor with controller (disconnect switch) for motor exposure indicated.
  - 1. Electrical Characteristics:
    - a. Phase: Single phase.
    - b. Volts: 115 V.
    - c. Hertz: 60.
  - 2. Motor Size: Minimum size as indicated. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate ratings or service factor.
- E. Obstruction Detection Device: External entrapment protection consisting of indicated automatic safety sensor capable of protecting full width of door opening. Activation of device immediately stops and reverses downward door travel.
  - 1. Photoelectric Sensor: Manufacturer's standard system designed to detect an obstruction in door opening without contact between door and obstruction.
    - a. Self-Monitoring Type: Designed to interface with door operator control circuit to detect damage to or disconnection of sensing device. When self-monitoring feature is activated, door closes only with sustained pressure on close button.
- F. Control Station: Three-button control station in fixed location with momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure, push-button control labeled "Close."
  - 1. Interior-Mounted Units: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.
- G. Emergency Manual Operation: Equip electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf.

- H. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
- I. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Install sectional doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Tracks: Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track and door-operating equipment.
- C. Accessibility: Install sectional doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.
- D. Power-Operated Doors: Install automatic garage doors openers according to UL 325.
- E. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
- F. Touch-up Painting: Immediately after welding galvanized materials, clean welds and abraded galvanized surfaces and repair galvanizing to comply with ASTM A 780/A 780M.

#### **3.2 DEMONSTRATION**

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain sectional doors.

### **END OF SECTION 08 3613**

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## **SECTION 08 7100 - 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. This Section includes the following:
  - 1. Commercial door hardware for the following:
    - a. Swinging doors.
    - b. Other doors to the extent indicated.
  - 2. Cylinders for doors specified in other Sections.
- B. Related Sections include the following:
  - 1. Division 08 Section "Hollow Metal Doors and Frames"
  - 2. Division 08 Section "Sectional Doors"

#### **1.3 SUBMITTALS**

- A. Product Data: Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Samples for Verification: For exposed door hardware of each type, in specified finish, full size. Tag with full description for coordination with the door hardware sets. Submit Samples before, or concurrent with, submission of the final door hardware sets, if requested.
  - 1. Samples will be returned to Contractor. Units that are acceptable and remain undamaged through submittal, review, and field comparison process may, after final check of operation, be incorporated into the Work, within limitations of keying requirements.
  - 2. Detail interface between electrified door hardware and fire alarm, access control, security, building control system.
- C. Qualification Data: For Installer.
- D. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for locks, latches, and closers as requested.
- E. Maintenance Data: For each type of door hardware to include in maintenance manuals. Include final hardware and keying schedule.
- F. Warranty: Special warranty specified in this Section.
- G. Door Hardware Sets: Prepared by or under the supervision of Architectural Hardware Consultant, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final door hardware sets with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
  - 1. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
  - 2. Content: Include the following information:
    - a. Identification number, location, hand, fire rating, and material of each door and frame.
    - b. Type, style, function, size, quantity, and finish of each door hardware item.
    - c. Complete designations of every item required for each door or opening including name and manufacturer.
    - d. Fastenings and other pertinent information.
    - e. Location of each door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.

- f. Explanation of abbreviations, symbols, and codes contained in schedule.
  - g. Mounting locations for door hardware.
  - h. Door and frame sizes and materials.
  - i. List of related door devices specified in other Sections for each door and frame.
- 3. Submittal Sequence: Submit the final door hardware sets at earliest possible date, particularly where approval of the door hardware sets must precede fabrication of other work that is critical in Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the door hardware sets.
- H. Keying Schedule: Prepared by or under the supervision of Architectural Hardware Consultant, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.

#### **1.4 QUALITY ASSURANCE**

- A. Installer Qualifications: An employer of workers trained and approved by lock manufacturer.
  - 1. Installer's responsibilities include supplying and installing door hardware and providing a qualified Architectural Hardware Consultant available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.
  - 2. Installer shall have warehousing facilities in Project's vicinity.
  - 3. Scheduling Responsibility: Preparation of door hardware and keying schedules.
  - 4. 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. Architectural Hardware Consultant Qualifications: A person who is currently certified by DHI as an Architectural Hardware Consultant and who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project.
- C. Source Limitations: Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.
  - 1. Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated. Manufacturers that perform electrical modifications and that are listed by a testing and inspecting agency acceptable to authorities having jurisdiction are acceptable.
- D. Keying Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." In addition to Owner, Construction Manager, Contractor, and Architect, conference participants shall also include Installer's Architectural Hardware Consultant and Owner's Security Consultant. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including, but not limited to, the following:
  - 1. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
  - 2. Preliminary key system schematic diagram.
  - 3. Requirements for key control system.
  - 4. Address for delivery of keys.
- E. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

#### **1.5 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 related to the final door hardware sets, and include basic installation instructions, templates, and necessary fasteners with each item or package.
- C. Deliver keys to Owner's Representative by registered mail or overnight package service.

## **1.6 COORDINATION**

- A. Coordinate layout and installation of recessed hardware with floor construction. Cast anchoring inserts into concrete. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- B. Templates: Distribute door hardware templates for doors, frames, and other work specified to be factory prepared for installing door hardware. 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. Coordinate with aluminum entrance door supplier for door hardware installation.

## **1.7 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including excessive deflection, cracking, or breakage.
    - b. Faulty operation of operators and door hardware.
    - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
  - 2. Warranty Period: Three (3) years from date of Substantial Completion.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Products:
    - a. Finish: Shall be US26D as indicated in hardware schedule, unless otherwise noted.
    - b. Manufacture Standard:
      - 1) Butts: Hager, McKinney, Stanley, Ives\*
      - 2) Locksets: Schlage\*
      - 3) Closers: LCN\*
      - 4) Trim: BBW, Rockwood, Hager, Ives\*
      - 5) Seals: Pemko, Zero, NGP\*

### **2.2 SCHEDULED HARDWARE**

- A. Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of finish hardware are indicated in the "Hardware Schedule" at the end of this Section. Products are identified by using hardware designation numbers of the following:
  - 1. Manufacturer's Product Designations: The product designation and name of one manufacturer are listed for each hardware type required for the purpose of establishing minimum requirements. Provide either the product designated or, where more than one manufacturer is specified under the Article "Manufacturers" in Part 2 for each hardware type, the comparable product of one of the other manufacturers that complies with requirements.
  - 2. ANSI/BHMA designations used elsewhere in this Section or in schedules to describe hardware items or to define quality or function are derived from the following standards. Provide products complying with these standards and requirements specified elsewhere in this Section.
    - a. Butts and Hinges: ANSI A156.1.
    - b. Bored and Preassembled Locks and Latches: ANSI/BHMA A156.2.
    - c. Materials and Finishes: ANSI A156.18.
- B. Provide products for each door that comply with requirements indicated in Part 2 and door hardware schedule.
  - 1. Door hardware is scheduled in Part 3.

### **2.3 MATERIALS AND FABRICATION**

- A. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable ANSI/BHMA A156 series standards for each type of hardware

item and with ANSI/BHMA A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.

- B. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.
- C. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.
- D. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of reinforcing the work adequately to fasten the hardware securely. Where thru-bolts are used as a means of reinforcing the work, provide sleeves for each thru-bolt or use sex screw fasteners.

## **2.4 HINGES, GENERAL**

- A. Quantity: Provide the following, unless otherwise indicated:
  - 1. Three Hinges: For doors with heights 61 to 90 inches.
- B. Template Requirements: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
- C. Hinge Weight: As indicated in hardware sets.
- D. Hinge Base Metal: Unless otherwise indicated, provide the following:
  - 1. Exterior Hinges: Stainless steel with stainless-steel pin.
  - 2. Interior Hinges: Steel with steel pin.
- E. Hinge Options: Where indicated in door hardware sets or on Drawings:
  - 1. Nonremovable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for outswinging doors.
  - 2. Corners: Square.
- F. Fasteners: Comply with the following:
  - 1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.

## **2.5 LOCKS, LATCHES, AND BOLTS**

- A. Strikes: Provide manufacturer's standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame, finished to match hardware set, unless otherwise indicated.
- B. Lock Throw: Provide 5/8-inch minimum throw of latch on pairs of doors. Comply with UL requirements for throw of bolts and latch bolts on rated fire openings.
- C. Cylindrical Locks - ANSI A156.2 Series 4000, Grade 1 Strength and Operational requirements. Meets A117.1 Accessibility Codes. Latch bolts shall be steel with minimum 1/2" throw, deadlocking on keyed and exterior functions. 3/4" throw anti-friction latchbolt on pairs of fire doors. Locksets to be tested to exceed 3,000,000 cycles. Lock case shall be steel. Lock shall incorporate one piece spring cage and spindle. Provide 5/8" minimum throw of latch and deadbolt used on pairs of doors. Provide Seven Year Warranty.

## **2.6 MANUAL FLUSH BOLTS**

- A. Manual Flush Bolts: BHMA A156.16; minimum 3/4-inch (19-mm) throw; designed for mortising into door edge.

## **2.7 KEYING REQUIREMENTS**

- A. General: Supplier will meet with Owner to finalize keying requirements and obtain final instructions in writing.
- B. Review the keying system with the Owner and provide a new Primus/Everest D master, grandmaster or great-grandmaster integrated with Owner's existing system. If key pinning charts are required, owner to furnish charts to hardware supplier.
- C. Furnish temporary keyed cores for the construction period, and remove these when directed. The construction cores remain property of the supplier and shall be returned to the supplier when they are removed. Contractor shall install the permanent cores in the presence of the owner's representative.
- D. Permanent Keys: Secured shipment direct from point of origination to Owner's Representative
  - 1. For estimate: 2 keys per change combination, 5 master keys per group, 5 grand-master keys, 3 control keys.

## **2.8 TRIM AND STOPS**

- A. Doorstops shall be furnished for all doors to prevent damage to doors or hardware from striking adjacent walls or fixtures. Wall stops are preferred. Floor stops are used only where noted in hardware schedule. Where conditions prohibit the use wall type stops, furnish overhead stops either surface mounted or concealed as noted in hardware sets.

## **2.9 LOCK CYLINDERS**

- A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver. Provide cylinder from same manufacturer of locking devices.
- B. Standard Lock Cylinders: BHMA A156.5; Grade 1 permanent cores; face finished to match lockset.

## **2.10 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 instructions 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.

## **2.11 DOOR GASKETING**

- A. Door Gasketing: BHMA A156.22; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.

## **2.12 HARDWARE FINISHES**

- A. Match items to the manufacturer's standard color and texture finish for the latch and locksets (or push-pull units if no latch or lock sets).
- B. Provide finishes that match those established by BHMA or, if none established, match the Architect's sample.
- C. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.
- D. The designations used in schedules and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18, "Materials and Finishes," including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.



## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. 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 PREPARATION**

- A. Steel Doors and Frames: Comply with DHI A115 Series.
  - 1. Surface-Applied Door Hardware: Drill and tap doors and frames according to ANSI A250.6.

### **3.3 INSTALLATION**

- A. Pre-installation conference shall be conducted prior to installation of hardware at Project site. Meet with the, Owner, Contractor, installer, and manufacturers representatives. A separate pre-installation conference shall be conducted prior to the installation of electronic security hardware with the electrical contractor Review catalogs, brochures, templates, installation instructions, and the approved hardware schedule. Survey installation procedures and workmanship, with special emphasis on unusual conditions, as to ensure correct technique of installation, and coordination with other work. Notify participants at least ten, 10 working days before conference.
- B. Hardware Installers must have a minimum of five (5) years experience in installation of hardware. Provide verification of installer's qualification to Consultant for approval. All installers to attend review meetings with the hardware distributor.
- C. Install hardware using only manufacturer supplied and approved fasteners in strict adherence with manufacturers published installation instructions.
- D. Install head seal prior to installation of "PA"-parallel arm mounted door closers and push side mounted door stops/holders. Trim, cut and notch thresholds and saddles neatly to minimally fit the profile of the door frame. Install thresholds and saddles in a bed of caulking completely sealing the underside from water and air penetration.
- E. Counter sink through bolt of door pull under push plate during installation.
- F. Mounting Heights: Mount door hardware units at heights indicated, as follows, unless otherwise indicated or required to comply with governing regulations.
  - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
- G. 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 specified in Division 09 Sections. 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.

### **3.4 ADJUSTING**

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

### 3.5 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.

### 3.6 DOOR HARDWARE SETS

#### HW SET NO: 01

DOOR NUMBER: (Includes but is not limited to the following doors)

Sectional Door

1 EA	CYLINDER HOUSING	AS REQ'D BY DOOR MFG	630	SCH
1 EA	PERMANENT CORE	23-065	626	SCH
	REMAINING HARDWARE	BY DOOR MFG	630	B/O

#### HW SET NO: 02

DOOR NUMBER: (Includes but is not limited to the following doors)

Exterior Doors

3 EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
1 EA	LOCK SET	ND80PD RHO	626	SCH
1 EA	DEAD BOLT	B660P	626	SCH
1 EA	CLOSER	1460-3077EDA	ALUM	LCN
1 EA	STOP	WS401CCV	626	IVE
1 SET	SEALS	700SA	CL	NGP
1 EA	DOOR SWEEP	C627A	CL	NGP
1 EA	THRESHOLD	42HD	AL	NGP

#### HW SET NO: 03

DOOR NUMBER: (Includes but is not limited to the following doors)

Toilet Rm Door

3 EA	HINGE	5PB1 4.5 X 4.5	630	IVE
1 EA	PRIVACY LOCK SET	ND40S RHO	626	SCH
1 EA	STOP	WS401CCV	626	IVE

#### HW SET NO: 04

DOOR NUMBER: (Includes but is not limited to the following doors)

Closet Door

3 EA	HINGE	5PB1 4.5 X 4.5	630	IVE
1 EA	PASSAGE SET	ND10S RHO	626	SCH
1 EA	STOP	WS401CVX	626	IVE

#### HW SET NO: 05

DOOR NUMBER: (Includes but is not limited to the following doors)

Pair Doors  
Each door to  
receive unless  
noted otherwise

3 EA	HINGE	5BB1 4.5 X 4.5 NRP	630	IVE
1 EA	LOCK SET (active side only)	ND66PD RHO	626	SCH
2 EA	FLUSH BOLT (inactive side only)	FB258N w/DP2	626	IVE
1 EA	STOP	WS401CCV	626	IVE
1 SET	SEALS	700SA	CL	NGP
1 EA	DOOR SWEEP	C627A	CL	NGP

END OF SECTION 08 7100

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## **SECTION 08 8000 - GLAZING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes:
  - 1. Glass for windows.
  - 2. Glazing sealants and accessories.

#### **1.2 COORDINATION**

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

#### **1.4 WARRANTY**

- A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
  - 1. Warranty Period: 10 years from date of Substantial Completion.
- B. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
  - 1. Warranty Period: 10 years from date of Substantial Completion.

### **PART 2 - PRODUCTS**

#### **2.1 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. AGC Glass Company North America, Inc.
  - 2. Cardinal Glass Industries.
  - 3. Guardian Glass; SunGuard.
  - 4. Northwestern Industries, Inc.
  - 5. Oldcastle BuildingEnvelope™.
  - 6. Pilkington North America.
  - 7. PPG Industries, Inc.
  - 8. Viracon, Inc.

#### **2.2 PERFORMANCE REQUIREMENTS**

- A. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the International Building Code and ASTM E 1300.
  - 1. Design Wind Pressures: As indicated on Drawings.

2. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.
- B. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
1. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
  2. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
  3. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

## **2.3 GLASS PRODUCTS, GENERAL**

- A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
1. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.
- D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.
- E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

## **2.4 GLASS PRODUCTS**

- A. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear), Quality-Q3.
- B. Heat-Strengthened Float Glass: ASTM C 1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear), Quality-Q3.
- C. Coated Clear Float-Glass Units: Class 1 (clear), Kind HS (heat-strengthened) or Kind FT (fully tempered), float glass.

## **2.5 INSULATING GLASS**

- A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190.
1. Sealing System: Dual seals.
  2. Perimeter Spacer: Manufacturer's standard spacer material and construction.

## **2.6 GLAZING SEALANTS**

- A. General:

1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

## **2.7 MISCELLANEOUS GLAZING MATERIALS**

- A. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- B. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
- C. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- D. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).
- E. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

## **PART 3 - EXECUTION**

### **3.1 GLAZING, GENERAL**

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- F. Provide spacers for glass lites where length plus width is larger than 50 inches.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

### **3.2 GASKET GLAZING (DRY)**

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

### **3.3 CLEANING AND PROTECTION**

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
  - 1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.

### **3.4 MONOLITHIC GLASS SCHEDULE**

- A. Glass Type: Clear heat-strengthened float glass.
  - 1. Minimum Thickness: 6 mm.

### **3.5 INSULATING GLASS SCHEDULE**

- A. Glass Type: Low-E-coated, clear insulating glass.
  - 1. Basis-of-Design Product: Solarban 60.
  - 2. Overall Unit Thickness: 1 inch.
  - 3. Minimum Thickness of Each Glass Lite: 6 mm.
  - 4. Outdoor Lite: Heat-strengthened float glass.
  - 5. Interspace Content: Air.
  - 6. Indoor Lite: Heat-strengthened float glass.
  - 7. Low-E Coating: Pyrolytic on second or third surface.
  - 8. Winter Nighttime U-Factor: 0.29 maximum.
  - 9. Visible Light Transmittance: 70 percent minimum.
  - 10. Solar Heat Gain Coefficient: 0.38 maximum.

**END OF SECTION 08 8000**

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### **DIVISION 09 - FINISHES**

092900	GYPSUM BOARD
096513	RESILIENT BASE AND ACCESSORIES
099113	EXTERIOR PAINTING
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## **SECTION 09 2900 - GYPSUM BOARD**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Interior gypsum board.
  - 2. Texture finishes.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Samples:
  - 1. Textured Finishes: Manufacturer's standard size for each textured finish indicated and on same backing indicated for Work.

### **PART 2 - PRODUCTS**

#### **2.1 INTERIOR GYPSUM BOARD**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. American Gypsum.
  - 2. CertainTeed Corp.
  - 3. Georgia-Pacific Gypsum LLC.
  - 4. National Gypsum Company.
  - 5. PABCO Gypsum.
  - 6. USG Corporation.
- B. Gypsum Board, Type X: ASTM C 1396/C 1396M.
  - 1. Thickness: 5/8 inch.
  - 2. Long Edges: Tapered.
- C. Gypsum Ceiling Board: ASTM C 1396/C 1396M.
  - 1. Thickness: 1/2 inch.
  - 2. Long Edges: Tapered.

#### **2.2 TRIM ACCESSORIES**

- A. Interior Trim: ASTM C 1047.
  - 1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
- B. Aluminum Trim: ASTM B 221, Alloy 6063-T5.

#### **2.3 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.

## 2.4 AUXILIARY MATERIALS

- A. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
- B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
- C. Thermal Insulation: As specified in Section 07 2100 "Thermal Insulation."

## 2.5 TEXTURE FINISHES

- A. Primer: As recommended by textured finish manufacturer.
- B. Aggregate Finish: Water-based, job-mixed, aggregated, drying-type texture finish for spray application.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. CertainTeed Corp.; ProRoc Wall and Ceiling Spray Texture.
    - b. Georgia-Pacific Gypsum LLC; ToughRock Ceiling Textures/Vermiculite.
    - c. USG Corporation; SHEETROCK Wall and Ceiling Spray Texture (Aggregated).
  - 2. Wall and Ceiling Texture: Light stipple.

## PART 3 - EXECUTION

### 3.1 APPLYING AND FINISHING PANELS

- A. Comply with ASTM C 840.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. 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.
- D. Install 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.
  - 1. Interior Trim: Install in the following locations:
    - a. Cornerbead: Use at outside corners, unless otherwise indicated.
    - b. Bullnose Bead: Use where indicated.
    - c. LC-Bead: Use at exposed panel edges.
    - d. L-Bead: Use where indicated.
    - e. U-Bead: Use at exposed panel edges.
    - f. Curved-Edge Cornerbead: Use at curved openings.
  - 2. Aluminum Trim: Install in locations indicated on Drawings.
  - 3. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- E. Prefill open joints and damaged surface areas.
- F. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- G. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
  - 1. Level 3: Panels that are substrates for wall coverings and wall panels..
  - 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 9123 "Interior Painting."
- H. Texture Finish Application: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Mix and apply finish using powered spray equipment, to produce a uniform texture matching approved mockup and free of starved spots or other evidence of thin application or of application patterns.

- I. Protect adjacent surfaces from drywall compound and texture finishes and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- J. Remove and replace panels that are wet, moisture damaged, and mold damaged.

### **3.2 FIELD QUALITY CONTROL**

- A. Above-Ceiling Observation: Architect will conduct an above-ceiling observation before installing gypsum board ceilings and report deficiencies in the Work observed. Do not proceed with installation of gypsum board to ceiling support framing until deficiencies have been corrected.
  - 1. Notify Architect seven days in advance of date and time when Project, or part of Project, will be ready for above-ceiling observation.
  - 2. Before notifying Architect, complete the following in areas to receive gypsum board ceilings:
    - a. Installation of 80 percent of lighting fixtures, powered for operation.
    - b. Installation, insulation, and leak and pressure testing of water piping systems.
    - c. Installation of air-duct systems.
    - d. Installation of air devices.
    - e. Installation of mechanical system control-air tubing.
    - f. Installation of ceiling support framing.

**END OF SECTION 09 2900**

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## **SECTION 09 6513 - RESILIENT BASE AND ACCESSORIES**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Resilient base.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Samples: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches long, of each resilient product color, texture, and pattern required.

#### **1.3 QUALITY ASSURANCE**

- A. Fire-Test-Response Characteristics: 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.

#### **1.4 PROJECT CONDITIONS**

- A. Maintain ambient temperatures within range recommended by manufacturer in spaces to receive resilient products.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer.
- C. Install resilient products after other finishing operations, including painting, have been completed.

### **PART 2 - PRODUCTS**

#### **2.1 THERMOPLASTIC-RUBBER BASE**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Roppe Corporation, USA.
- B. Product Standard: ASTM F 1861, Type TP (rubber, thermoplastic).
  - 1. Group: I (solid, homogeneous).
  - 2. Style: Style B, Cove.
- C. Thickness: 0.125 inch.
- D. Height: 4 inches.
- E. Lengths: Manufacturer's standard length.
- F. Outside Corners: Job formed.
- G. Inside Corners: Job formed.
- H. Colors: As selected by Architect from full range of industry colors.

#### **2.2 INSTALLATION MATERIALS**

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

### **PART 3 - EXECUTION**

#### **3.1 PREPARATION**

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- C. Do not install resilient products until they are same temperature as the space where they are to be installed.
  - 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- D. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

#### **3.2 RESILIENT BASE INSTALLATION**

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.

#### **3.3 CLEANING AND PROTECTION**

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B. Cover resilient products until Substantial Completion.

**END OF SECTION 09 6513**

## SECTION 09 9113 - EXTERIOR PAINTING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following exterior substrates:
  - 1. Steel and iron.

#### 1.2 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- D. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- E. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- F. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
  - 1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
- B. Samples: For each type of paint system and each color and gloss of topcoat.

#### 1.4 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
    - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft..
    - b. Other Items: Architect will designate items or areas required.
  - 2. Final approval of color selections will be based on mockups.
    - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Benjamin Moore & Co.
  - 2. Coronado Paint; Benjamin Moore Company.
  - 3. Dulux (formerly ICI Paints); a brand of AkzoNobel.
  - 4. Glidden Professional.
  - 5. Kelly-Moore Paint Company Inc.
  - 6. Kwal Paint; Comex Group.
- B. Products: Subject to compliance with requirements, provide one of the products listed in the Exterior Painting Schedule for the paint category indicated.

## **2.2 PAINT, GENERAL**

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:
  - 1. Materials for use within each paint system shall be 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, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- C. Colors: As selected by Architect from manufacturer's full range.

## **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. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- C. 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 Architectural Painting Specification 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.

### **3.3 APPLICATION**

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."
- B. 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.

### **3.4 CLEANING AND PROTECTION**

- A. 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.
- B. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

### **3.5 EXTERIOR PAINTING SCHEDULE**

- A. Steel and Iron Substrates:
  - 1. Water-Based Light Industrial Coating System MPI EXT 5.1C:
    - a. Prime Coat: Shop primer specified in Section where substrate is specified.
    - b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
    - c. Topcoat: Light industrial coating, exterior, water based, semi-gloss (MPI Gloss Level 5), MPI #163.



**END OF SECTION 09 9113**

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## SECTION 09 9123 - INTERIOR PAINTING

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section includes surface preparation and the application of paint systems on the following interior substrates:
  - 1. Steel and iron.
  - 2. Wood.
  - 3. Gypsum board.

#### 1.2 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
- B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
- D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
- F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
- G. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
  - 1. Include Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
- B. Samples: For each type of paint system and in each color and gloss of topcoat.

#### 1.4 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
    - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft..
    - b. Other Items: Architect will designate items or areas required.
  - 2. Final approval of color selections will be based on mockups.
    - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Benjamin Moore & Co.
  - 2. Coronado Paint; Benjamin Moore Company.
  - 3. Dulux (formerly ICI Paints); a brand of AkzoNobel.
  - 4. Glidden Professional.
  - 5. Kelly-Moore Paint Company Inc.

6. Kwal Paint; Comex Group.

- B. Products: Subject to compliance with requirements, provide one of the products listed in the Interior Painting Schedule for the paint category indicated.

## **2.2 PAINT, GENERAL**

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:
1. Materials for use within each paint system shall be 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, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- C. Colors: As selected by Architect from manufacturer's full range.

## **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 CMUs): 12 percent.
  2. Wood: 15 percent.
  3. Gypsum Board: 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. 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 Architectural Painting Specification 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 if any.

### **3.3 APPLICATION**

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
- B. 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.

### **3.4 INTERIOR PAINTING SCHEDULE**

- A. Steel Substrates:
1. Water-Based Light Industrial Coating System MPI INT 5.1B:

- a. Prime Coat: Primer, rust-inhibitive, water based MPI #107.
  - b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.
  - c. Topcoat: Light industrial coating, interior, water based, semi-gloss (MPI Gloss Level 5), MPI #153.
- B. Wood Substrates: Wood trim.
  - 1. Latex over Latex Primer System MPI INT 6.3T:
    - a. Prime Coat: Primer, latex, for interior wood, MPI #39.
    - b. Intermediate Coat: Latex, interior, matching topcoat.
    - c. Topcoat: Light industrial coating, interior, water based, semi-gloss (MPI Gloss Level 5), MPI #153.
- C. Gypsum Board Substrates:
  - 1. Latex over Latex Sealer System MPI INT 9.2A:
    - a. Prime Coat: Primer sealer, latex, interior, MPI #50.
    - b. Intermediate Coat: Latex, interior, matching topcoat.
    - c. Topcoat: Latex, interior, semi-gloss (MPI Gloss Level 5), MPI #54.

**END OF SECTION 09 9123**

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### **DIVISION 10 - SPECIALITIES**

102800 TOILET, BATH, AND LAUNDRY ACCESSORIES

## **SECTION 10 2800 - TOILET, BATH, AND LAUNDRY ACCESSORIES**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Public-use washroom accessories.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
  - 1. Identify locations using room designations indicated.
  - 2. Identify products using designations indicated.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Warranty: Sample of special warranty.

#### **1.4 CLOSEOUT SUBMITTALS**

- A. Maintenance data.

#### **1.5 WARRANTY**

- A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: 15 years from date of Substantial Completion.

### **PART 2 - PRODUCTS**

#### **2.1 PUBLIC-USE WASHROOM ACCESSORIES**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. A & J Washroom Accessories, Inc.
  - 2. American Specialties, Inc.
  - 3. Bobrick Washroom Equipment, Inc.
  - 4. Bradley Corporation.
  - 5. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
  - 6. Tubular Specialties Manufacturing, Inc.
- B. Toilet Tissue Dispenser:
  - 1. Basis-of-Design Product: Bobrick B-6857.
  - 2. Description: Single-roll dispenser.
  - 3. Mounting: Surface mounted.
  - 4. Capacity: Designed for 4-1/2- or 5-inch-diameter tissue rolls.
  - 5. Material and Finish: Stainless steel, No. 4 finish (satin).
  - 6. Locations: Toilet Room.
- C. Paper Towel Dispenser:
  - 1. Basis-of-Design Product: Bobrick B-262.
  - 2. Description: Hinged front equipped with tumbler lockset; and with refill indicators that are pierced slots at sides or front.
  - 3. Mounting: Surface mounted.
  - 4. Capacity: Sized minimum 400 single-fold towels.
  - 5. Material and Finish: Stainless steel, No. 4 finish (satin).



6. Locations: Toilet Room.
- D. Soap Dispenser:
1. Basis-of-Design Product: Bobrick B-2111.
  2. Description: Liquid Soap Dispenser, Vertical-tank Type.
  3. Mounting: Surface mounted.
  4. Capacity: Sized for 40-fluid-ounce minimum capacity.
  5. Material and Finish: Stainless steel, No. 4 finish (satin).
  6. Locations: Toilet Room.
- E. Grab Bar:
1. Basis-of-Design Product: Bobrick B-6206.
  2. Mounting: Flanges with concealed fasteners.
  3. Material: Stainless steel, 0.05 inch thick.
    - a. Finish: Smooth, No. 4 finish (satin).
  4. Outside Diameter: 1-1/4 inches.
  5. Configuration and Length: 1 ea. B-6206-36", 1 ea. B-6206-42" and 1 ea. B-6206-18" in Toilet Room.
- F. Mirror Unit:
1. Basis-of-Design Product: Bobrick B-165.
  2. Frame: Stainless-steel channel.
    - a. Corners: Manufacturer's standard.
  3. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.
    - a. Wall bracket of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.
  4. Size and location:
    - a. 1 ea. B-165 x 2436 in Toilet Room..

### **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. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F 446.

**END OF SECTION 10 2800**

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## SECTION 220501 - COMMON PLUMBING REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Furnish labor, materials, and equipment necessary for completion of work as described in Contract Documents.
- B. It is the intent of these specifications that the systems specified herein are to be complete and operational before being turned over to the owner. During the bidding process, the contractor is to ask questions or call to the engineer's attention any items that are not shown or may be required to make the system complete and operational. Once the project is bid and the contractor has accepted the contract, it is his responsibility to furnish and install all equipment and parts necessary to provide a complete and operational system without additional cost to the owner.
- C. Furnish and install fire stopping materials to seal penetrations through fire rated structures and draft stops.

#### 1.3 SUBMITTALS

- A. Substitutions: By specific designation and description, standards are established for specialties and equipment. Other makes of specialties and equipment of equal quality will be considered provided such proposed substitutions are submitted to the Architect for his approval, complete with specification data showing how it meets the specifications, at least 5 working days prior to bid opening. A list of approved substitutions will be published as an addendum, but does not relieve Contractor from meeting all requirements of the specifications.
  - 1. Submit a single copy of Manufacturer's catalog data including Manufacturer's complete specification for each proposed substitution.
  - 2. The Architect or Engineer is to be the sole judge as to the quality of any material offered as an equal.
- B. Product Data, Shop Drawings: Within 30 days after award of contract, submit 10 sets of Manufacturer's catalog data for each manufactured item.
  - 1. Literature shall include enough information to show complete compliance with Contract Document requirements.
  - 2. Mark literature to indicate specific item with applicable data underlined.
  - 3. Information shall include but not be limited to capacities, ratings, type of material used, guarantee, and such dimensions as are necessary to check space requirements.
  - 4. When accepted, submittal shall be an addition to Contract Documents and shall be in equal force. No variation shall be permitted.
  - 5. Even though the submittals have been accepted by the Engineer, it does not relieve the contractor from meeting all of the requirements of the plans and specifications and providing a complete and operational system.
- C. Drawings of Record: One complete set of blue line mechanical drawings shall be provided for the purpose of showing a complete picture of the work as actually installed.
  - 1. These drawings shall serve as work progress report sheets. Contractor shall make notations neat and legible therein daily as the work proceeds.
  - 2. The drawings shall be kept at the job at a location designated by the Mechanical Engineer.
  - 3. At completion of the project these "as-built" drawings shall be signed by the Contractor, dated, and returned to the Architect.
- D. Operating Instructions and Service Manual: The Mechanical Contractor shall prepare 2 copies of an Operation and Maintenance Manual for all mechanical systems and equipment used in this project. Manuals shall be bound in hard-backed binders and the front cover and spine of each binder shall indicate the name and location of the project. Use plastic tab indexes for all sections. Provide a section for each different type of equipment item. The following items shall be included in the manual, together with any other pertinent data. This list is not complete and is to be used as a guide.
  - 1. Provide a master index at the beginning of the manual showing all items included.
  - 2. The first section of the manual shall contain:
    - a. Names, addresses, and telephone numbers of Architect, Mechanical Engineer, Electrical Engineer, General Contractor, Plumbing Contractor, Sheet Metal Contractor, and Temperature Control Contractor.

- b. List of Suppliers which shall include a complete list of each piece of equipment used with the name, address, and telephone number of vendor.
- c. General Description of Systems including –
  - 1) Location of all major equipment
  - 2) Description of the various mechanical systems
  - 3) Description of operation and control of the mechanical systems
  - 4) Suggested maintenance schedule
- d. Copy of contractor's written warranty
- 3. Provide a copy of approved submittal literature for each piece of equipment.
- 4. Provide maintenance and operation literature published by the manufacturer for each piece of equipment which includes: oiling, lubrication and greasing data; belt sizes, types and lengths; wiring diagrams; step-by-step procedure to follow in putting each piece of mechanical equipment in operation.
- 5. Include parts numbers of all replaceable items.
- 6. Provide control diagram and operation sequence, along with labeling of control piping and instruments to match diagram.
- 7. Include a valve chart indicating valve locations.
- 8. Include air balance and/or water balance reports.

#### **1.4 QUALITY ASSURANCE**

- A. Requirements of Regulatory Agencies:
  - 1. Perform work in accordance with applicable provisions of local and state Plumbing Code, Gas Ordinances, and adoptions thereof. Provide materials and labor necessary to comply with rules, regulations, and ordinances.
  - 2. In case of differences between building codes, state laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern. Promptly notify Architect in writing of such differences.
- B. Applicable Specifications: Referenced specifications, standards, and publications shall be of the issues in effect on date of Advertisement for Bid.
  - 1. "Heating, Ventilating and Air Conditioning Guide" published by the American Society of Heating and Air Conditioning Engineers.
  - 2. "Engineering Standards" published by the Heating, Piping, and Air Conditioning Contractors National Association.
  - 3. "2012 International Building Code", "2012 International Mechanical Code", and "2012 International Fire Code" as published by the International Conference of Building Officials.
  - 4. "2012 Idaho Plumbing Code" as published by the International Association of Plumbing and Mechanical Officials.
  - 5. "National Electrical Code" as published by the National Fire Protection Association.
  - 6. "2012 International Energy Conservation Code".

#### **1.5 INSPECTIONS AND PERMITS**

- A. Pay for permits, fees, or charges for inspection or other services. Local and state codes and ordinances must be properly executed without expense to Owner and are considered as minimum requirements. Local and state codes and ordinances do not relieve the Contractor from work shown that exceeds minimum requirements.

#### **1.6 ADDITIONAL WORK:**

- A. Design is based on equipment as described in the drawing equipment schedule. Any change in foundation bases, electrical wiring, conduit connections, piping, controls and openings required by alternate equipment submitted and approved shall be paid for by this division. All work shall be in accordance with the requirements of the applicable sections.

#### **PART 2 - NOT USED**

#### **PART 3 - EXECUTION**

##### **3.1 EXAMINATION**

- A. Site Inspection:
  - 1. Examine premises and understand the conditions which may affect performance of work of this Division before submitting proposals for this work.
  - 2. No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.

- B. Drawings:
1. Plumbing drawings show general arrangement of piping, equipment, etc, and do not attempt to show complete details of building construction which affect installation. This Contractor shall refer to architectural, structural, mechanical, and electrical drawings for additional building detail which affect installation of his work.
    - a. Follow plumbing drawings as closely as actual building construction and work of other trades will permit.
    - b. No extra payments will be allowed where piping and/or ductwork must be offset to avoid other work or where minor changes are necessary to facilitate installation.
    - c. Everything shown on the plumbing drawings shall be the responsibility of Plumbing Contractor unless specifically noted otherwise.
  2. Consider architectural and structural drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over mechanical drawings.
  3. Because of small scale plumbing drawings, it is not possible to indicate all offsets, fittings, and accessories which may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions. Do not scale drawings for locations of equipment or piping. Refer to large scale dimensioned drawings for exact locations.
- C. Insure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of Contract Documents.
1. If approval is received to use other than specified items, responsibility for specified capacities and insuring that items to be furnished will fit space available lies with this Division.
  2. If non-specified equipment is used and it will not fit job site conditions, this Contractor assumes responsibility for replacement with items named in Contract Documents.

### **3.2 PREPARATION**

- A. Cut carefully to minimize necessity for repairs to existing work. Do not cut beams, columns, or trusses.
1. Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown. Surface finishes shall exactly match existing finishes of same materials.
  2. Each Section of this Division shall bear expense of cutting, patching, repairing, and replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it.
  3. Cutting, patching, repairing, and replacing pavements, sidewalks, roads, and curbs to permit installation of work of this Division is responsibility of Section installing work.

### **3.3 INSTALLATION**

- A. Arrange pipes, ducts, and equipment to permit ready access to valves, unions, traps, starters, motors, control components, and to clear openings of doors and access panels.

### **3.4 STORAGE AND PROTECTION OF MATERIALS:**

- A. Provide storage space for storage of materials and assume complete responsibility for losses due to any cause whatsoever. Storage shall not interfere with traffic conditions in any public thoroughfare.
- B. Protect completed work, work underway, and materials against loss or damage.
- C. Close pipe openings with caps or plugs during installation. Cover fixtures and equipment and protect against dirt, or injury caused by water, chemical, or mechanical accident.

### **3.5 EXCAVATION AND BACKFILL**

- A. Perform necessary excavation of whatever substance encountered for proper laying of all pipes and underground ducts.
1. Excavated materials not required for fill shall be removed from site as directed by Engineer.
  2. Excavation shall be carried low enough to allow a minimum coverage over underground piping of 5'-0" or to be below local frost level.
  3. Excess excavation below required level shall be backfilled at Contractor's expense with earth, sand, or gravel as directed by Engineer. Tamp ground thoroughly.
  4. Ground adjacent to all excavations shall be graded to prevent water running into excavated areas.
- B. Backfill pipe trenches and allow for settlement.
1. Backfill shall be mechanically compacted to same density as surrounding undisturbed earth.
  2. Cinders shall not be used in backfilling where steel or iron pipe is used.

3. No backfilling shall be done until installation has been approved by the Engineer.

### **3.6 COOPERATION**

- A. Cooperate with other crafts in coordination of work. Promptly respond when notified that construction is ready for installation of work under Division 22. Contractor will be held responsible for any delays which might be caused by his negligence or failure to cooperate with the other Contractors or crafts.

### **3.7 SUPERVISION**

- A. Provide a competent superintendent in charge of the work at all times. Anyone found incompetent shall be removed at once and replaced by someone satisfactory, when requested by the Architect.

### **3.8 INSTALLATION CHECK:**

- A. An experienced, competent, and authorized representative of the manufacturer or supplier of each item of equipment indicated in the equipment schedule shall visit the project to inspect, check, adjust if necessary, and approve the equipment installation. In each case, the equipment supplier's representative shall be present when the equipment is placed in operation. The equipment supplier's representative shall revisit the project as often as necessary until all trouble is corrected and the equipment installation and operation is satisfactory to the Engineer.
- B. Each equipment supplier's representative shall furnish to the Owner, through the Engineer, a written report certifying the following:
  1. Equipment has been properly installed and lubricated.
  2. Equipment is in accurate alignment.
  3. Equipment is free from any undue stress imposed by connecting piping or anchor bolts.
  4. Equipment has been operated under full load conditions.
  5. Equipment operated satisfactorily.
- C. All costs for this installation check shall be included in the prices quoted by equipment suppliers.

### **3.9 CLEANING EQUIPMENT AND PREMISES**

- A. Properly lubricate equipment before Owner's acceptance.
- B. Clean exposed piping, equipment, and fixtures. Repair damaged finishes and leave everything in working order.
- C. Remove stickers from fixtures and adjust flush valves.
- D. Trap elements shall be removed during cleaning and flushing period. Replace trap elements and adjust after cleaning and flushing period.

### **3.10 TESTS**

- A. No piping work, fixtures, or equipment shall be concealed or covered until they have been inspected and approved by the inspector. Notify inspector when the work is ready for inspection.
- B. All work shall be completely installed, tested as required by Contract Documents and the city and county ordinances and shall be leak-tight before the inspection is requested.
- C. Tests shall be repeated to the satisfaction of those making the inspections.
- D. Water piping shall be flushed out, tested at 100 psi and left under pressure of supply main or a minimum of 40 psi for the balance of the construction period.

### **3.11 WARRANTY**

- A. Contractor shall guarantee work under Division 22 to be free from inherent defects for a period of one year from acceptance.
  1. Contractor shall repair, revise or replace any and all such leaks, failure or inoperativeness due to defective work, materials, or parts free of charge for a period of one year from final acceptance, provided such defect is not due to carelessness in operation or maintenance.

- B. In addition to warrantee specified in General Conditions and plumbing systems are to be free from noise in operation that may develop from failure to construct system in accordance with Contract Documents.

### **3.12 SYSTEM START-UP, OWNER'S INSTRUCTIONS**

- A. Owner's Instructions
1. Instruct building maintenance personnel and Owner Representative in operation and maintenance of mechanical systems utilizing Operation & Maintenance Manual when so doing.
  2. Minimum instruction periods shall be as follows –
    - a. Plumbing - Four hours.
  3. Instruction periods shall occur after Substantial Completion inspection when systems are properly working and before final payment is made.
  4. None of these instructional periods shall overlap another.

**END OF SECTION 220501**

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## **SECTION 220503 - PIPE, PIPE FITTINGS, PIPE HANGERS & VALVES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 22 05 01 apply to this Section.

#### **1.2 SUMMARY**

- A. General piping and valve materials and installation procedures for all piping systems.

#### **1.3 QUALITY ASSURANCE**

- A. Manufacture:
  - 1. Use domestic made valves, pipe and pipe fittings.
- B. General: Support components shall conform to Manufacturer's Standardization Society Specification SP-58.

### **PART 2 - PRODUCTS**

#### **2.1 VALVES**

- A. Use ball valves or butterfly valves everywhere unless noted otherwise.
- B. Approved Manufacturers:
  - 1. Crane
  - 2. Nibco
  - 3. Hammond
  - 4. Stockham
  - 5. Milwaukee
  - 6. Victaulic

#### **2.2 PIPE**

- A. Exposed waste, vent and water piping connections to fixtures shall be chrome plated.
- B. Condensate Drain Piping: Type "M" copper with sweat fittings or Schedule 40 PVC pipe and fittings.

#### **2.3 PIPE HANGERS**

- A. Adjustable, malleable iron clevis type of a diameter adequate to support pipe size.
- B. Approved Manufacturers:
  - 1. B-Line Systems Fig. B3100
  - 2. Grinnell No. 260
  - 3. Kin-Line 455
  - 4. Superstrut CL-710

#### **2.4 INSULATING COUPLINGS**

- A. Suitable for at least 175 PSIG WP at 250 deg F.
- B. Approved Manufacturers:
  - 1. Central Plastics Co
  - 2. Victaulic Co
  - 3. Watts Regulator Co

#### **2.5 EXPANSION JOINTS**

- A. Install at all building expansion joints and as shown on the drawings, flexible, or nipple/flexible coupling combinations for added expansion/deflection. Submit Manufacturer's data.

- B. Approved Manufacturers
  - 1. Victaulic Style 155, 150
  - 2. Grinnell - Gruv-Lok
  - 3. Garlock Garlflex 8100
  - 4. Vibration Mountings & Controls, Inc.

## **2.6 SLEEVES**

- A. Sleeves shall be standard weight galvanized iron pipe, Schedule 40 PVC, or 14 gauge galvanized sheet metal two sizes larger than pipe or insulation.
- B. Steel or heavy steel metal of the telescoping type of a size to accommodate pipe and covering wherever it passes through floors, walls, or ceilings.

## **2.7 INTERMEDIATE ATTACHMENTS**

- A. Continuous threaded rod may be used wherever possible.
- B. No chain, wire, or perforated strap shall be used.

## **2.8 FLOOR AND CEILING PLATES**

- A. Brass chrome plated

## **2.9 APPROVED MANUFACTURERS - Grinnell and Fee/Mason**

- A. Concrete Inserts: Grinnell Fig. 282
- B. Pipe Hanger Flange: Grinnell Fig. 163
- C. Vertical Pipe: Grinnell Fig. 261 or equal.
- D. Cast Iron Pipe: Grinnell Fig. 260 clevis hanger or equal
- E. Pipe Attachments for steel pipe with 1" or less of insulation:
  - 1. Grinnell Fig. 108 ring
  - 2. Grinnell Fig. 114 turnbuckle adjuster
  - 3. Or equal

# **PART 3 - EXECUTION**

## **3.1 INSTALLATION**

- A. Furnish and install complete system of piping, valved as indicated or as necessary to completely control entire apparatus. Pipe drawings are diagrammatic and indicate general location and connections. Piping may have to be offset, lowered, or raised as required or directed at site. This does not relieve this Contractor from responsibility for proper erection of systems of piping in every respect.
- B. Properly support piping and make adequate provisions for expansion, contraction, slope, and anchorage.
  - 1. Cut piping accurately for fabrication to measurements established at site and work into place without springing or forcing.
  - 2. Do not use pipe hooks, chains, or perforated metal for pipe support.
  - 3. Remove burr and cutting slag from pipes.
  - 4. Make changes in direction with proper fittings.
  - 5. Insulate hangers for copper pipe from piping by means of at least two layers of Scotch 33 plastic tape.
  - 6. Support piping at 8 feet on center maximum for pipe 1-1/4 inches or larger and 6 feet on center maximum for pipe one inch or less. Provide support at each elbow. Install additional support as required.
  - 7. Suspend piping from roof trusses or clamp to vertical walls using Unistrut and clamps (except underground pipe). Laying of piping on any building member is not allowed.
- C. Arrange piping to not interfere with removal of other equipment, ducts, or devices, or block access to doors, windows, or access openings. Provide accessible, ground joint unions in piping at connections to equipment.
- D. Make connections of dissimilar metals with insulating couplings.

- E. Provide sleeves around pipes passing through floors, walls, partitions, or structural members.
  - 1. Seal sleeves with plastic or other acceptable material.
  - 2. Do not place sleeves around soil, waste, vent, or roof drain lines passing through concrete floors on grade.
- F. Cap or plug open ends of pipes and equipment to keep dirt and other foreign materials out of system. Do not use plugs of rags, wool, cotton waste, or similar materials.
- G. Install piping systems so they may be easily drained.
- H. Grade soil and waste lines within building perimeter 1/4 inch fall per ft in direction of flow.
- I. Insulate water piping buried within building perimeter.
  - 1. Do not use reducing bushings, street elbows, or close nipples.
  - 2. Bury water piping 6 inches minimum below bottom of slab and encase in 2 inches minimum of sand.
  - 3. Do not install piping in shear walls.

### **3.2 HORIZONTAL PIPING INSTALLATION**

- A. Locate hangers, supports, and anchors near or at changes in piping direction and concentrated loads.
- B. Provide for vertical adjustment to maintain pitch required for proper drainage.
- C. Allow for expansion and contraction of the piping.

### **3.3 PIPE SLEEVES AND INSERTS**

- A. Set sleeves before concrete is poured or floors finished.
- B. Inserts for units should be placed in the concrete or masonry during construction to avoid cutting of finished work. When and if cutting becomes necessary, it must be done in accordance with the cutting and patching specifications.

### **3.4 FLOOR AND CEILING PLATES**

- A. Install on all pipes passing through floors, partitions, and ceilings.

### **3.5 UNIONS AND CONNECTIONS**

- A. Install malleable ground joint unions in hot and cold water piping throughout the system so that any portion can be taken down for repairs or inspections without injury to same or covering.
- B. Running threads or long screws will not be permitted in jointing any pipe.
- C. Provide dielectric waterways Style #47 between ferrous and non-ferrous metals.

### **3.6 FIRE STOPPING**

- A. Fire stop all penetrations of fire walls, fire barriers, fire petitions, and other fire rated walls and ceilings and floors as per IBC Section 711. See Specification 22 0800.

**END OF SECTION 220503**

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## SECTION 220553 - IDENTIFICATION FOR PLUMBING PIPES AND EQUIPMENT

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. Furnish and install identification of plumbing piping and equipment as described in Contract Documents.

### PART 2 - PRODUCTS

#### 2.1 Materials

- A. Paint:
  - 1. One Coat Primer:
    - a. 6-2 Quick Drying Latex Primer Sealer over fabric covers.
    - b. 6-205 Metal Primer under dark color paint.
    - c. 6-6 Metal Primer under light color paint.
  - 2. Finish Coats: Two coats 53 Line Acrylic Enamel.
  - 3. Performance Standard: Paints specified are from Pittsburgh Paint & Glass (PPG), Pittsburgh, PA [www.pittsburghpaints.com](http://www.pittsburghpaints.com) or PPG Canada Inc, Mississauga, ON (800) 263-4350 or (905) 238-6441.
  - 4. Type Two Acceptable Products. See Section 01 6200.
    - a. Paint of equal wuality from following Manufacturers may be submitted for Architect's approval before use. Maintain specified colors, shades, and contrasts.
      - 1) Benjamin Moore, Montvale, NJ [www.benjaminmoore.com](http://www.benjaminmoore.com) or Toronto, ON (800) 304-0304 or (416) 766-1176.
      - 2) ICI Dulux, Cleveland, OH or ICI Paints Canada Inc, Concord, ON [www.dulux.com](http://www.dulux.com).
      - 3) Sherwin Williams, Cleveland, OH [www.sherwin-williams.com](http://www.sherwin-williams.com).

#### 2.2 VALVE IDENTIFICATION

- A. Make a list of and tag all valves installed in this work.
  - 1. Valve tags shall be of brass, not less than 1"x2" size, hung with brass chains.
  - 2. Tag shall indicate plumbing or heating service.

### PART 3 - EXECUTION

#### 3.1 SCHEDULES

- A. Pipe Identification Schedule:
  - 1. Apply stenciled symbols as follows:

Pipe Use	Abbreviation
Domestic Cold Water	CH
Domestic Hot Water	HW

END OF SECTION 220553

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## **SECTION 220703 - MECHANICAL INSULATION AND FIRE STOPPING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 22 05 01 apply to this Section.

#### **1.2 SUMMARY**

- A. Furnish and install mechanical insulation and fire stopping as described in Contract Documents including but not limited to the following:
  - 1. Cold Water Piping Insulation
  - 2. Hot Water Piping Insulation (Domestic)
  - 3. Fire Stopping

#### **1.3 QUALITY ASSURANCE**

- A. Insulation shall have composite (insulation, jacket or facing and adhesive used to adhere facing or jacket to insulation) fire and smoke hazard ratings as tested by Procedure ASTM E-84, NFPA 255 and UL 723 not exceeding: Flame Spread of 25 and Smoke Developed of 50.
- B. Insulation Contractor shall certify in writing, prior to installation, that all products to be used will meet the above criteria.
- C. Accessories, such as adhesives, mastics, cements, and tapes, for fittings shall have the same component ratings as listed above.
- D. Products, or their shipping cartons, shall bear a label indicating that flame and smoke ratings do not exceed above requirements.
- E. Any treatment of jacket or facings to impart flame and smoke safety shall be permanent.
- F. The use of water-soluble treatments is prohibited.

**END OF SECTION 220703**

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## **SECTION 220705 - UNDERGROUND PIPING INSULATION**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 22 05 01 apply to this Section.

#### **1.2 SUMMARY**

- A. Furnish and install insulation on underground hot and cold water pipes within confines of building as described in Contract Documents.

### **PART 2 - PRODUCTS**

#### **2.1 MATERIAL**

- A. Insulation:
  - 1. 1/2 inch thick Armaflex Standard Pipe Insulation
  - 2. Equal by Rubatex
  - 3. Equal by Imcolock
- B. Joint Sealant:
  - 1. Armstrong 520

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Slip underground pipe insulation onto pipe and seal butt joints.
- B. Where slip-on technique is not possible, slit insulation, apply to pipe, and seal seams and joints.

**END OF SECTION 220705**

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## **SECTION 220710 - POTABLE WATER PIPE INSULATION**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 22 05 01 apply to this Section.

#### **1.2 SUMMARY**

- A. Furnish and install insulation on above ground hot and cold water lines, fittings, valves, pump bodies, flanges, and accessories as described in Contract Documents.

### **PART 2 - PRODUCTS**

#### **2.1 INSULATION**

- A. One inch thick snap-on glass fiber pipe insulation.
- B. Heavy density pipe insulation with factory vapor jacket equal to Fiberglass ASJ may be used.
- C. Approved Manufacturers:
  - 1. CTM
  - 2. Manville
  - 3. Owens-Corning
  - 4. Knauf

#### **2.2 PVC FITTING, VALVE, & ACCESSORY COVERS**

- A. Approved Manufacturers:
  - 1. Knauf
  - 2. Zeston

### **PART 3 - EXECUTION**

#### **3.1 APPLICATION**

- A. Piping:
  - 1. Apply insulation to clean, dry piping with joints tightly butted.
  - 2. Adhere "factory applied vapor barrier jacket lap" smoothly and securely at longitudinal laps with a white vapor barrier adhesive.
  - 3. Adhere 3 inch wide self-sealing butt joint strips over end joints.
- B. Fittings, Valves, & Accessories:
  - 1. Insulate with same type and thickness of insulation as pipe, with ends of insulation tucked snugly into throat of fitting and edges adjacent to pipe insulation tufted and tucked in.
  - 2. Cover insulation with one piece fitting cover secured by stapling or taping ends to adjacent pipe covering.
- C. Pipe Hangers:
  - 1. Do not allow pipes to come in contact with hangers.
  - 2. Provide 16 ga x 6 inch long galvanized shields at each pipe hanger to protect pipe insulation from crushing by clevis hanger.

**END OF SECTION 220710**

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## **SECTION 220711 - HANDICAPPED FIXTURES INSULATION**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, and Section 22 05 00 apply to this Section.

#### **1.2 SUMMARY**

- A. Furnish and install handicapped fixtures insulation as described in Contract Documents.

#### **1.3 QUALITY ASSURANCE**

- A. Insulating device must comply with UBC-85 and federal accessibility standards.
- B. Cover must meet federal standards for protection from burns and abrasions.

### **PART 2 - PRODUCTS**

#### **2.1 MANUFACTURED UNITS**

- A. Insulating device shall be molded fire resistant foam, to encapsulate hot water piping, stop, and P-trap.
  - 1. Approved Manufacturers:
    - a. TCI Products' Skal+Gard SG-100B
- B. Safety cover with recloseable sealing strips which allow for removal and replacement for line maintenance may be used on drain and supply lines under lavatories.
  - 1. Approved Manufacturers:
    - a. Handy-Shield
    - b. Plumberex
- C. Color shall be white.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Install tamper-proof locking strap to discourage pilferage.

**END OF SECTION 220711**

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## **SECTION 220800-- FIRE STOPPING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 22 05 01 apply to this Section.

#### **1.2 SUMMARY**

- A. Furnish and install fire stopping as described in Contract Documents.

#### **1.3 QUALITY ASSURANCE**

- A. Fire stopping material shall meet ASTM E814, E84 and be UL listed.

### **PART 2 - PRODUCTS**

#### **2.1 MANUFACTURED UNITS**

- A. Material shall be flexible, long lasting, intumescent acrylic seal to accommodate vibration and building movement.
- B. Caulk simple penetrations with gaps of 1/4" or less with:
  - 1. Dow Corning Fire Stop Sealant
  - 2. Pensil 300
- C. Caulk multiple penetrations and/or penetrations with gaps in excess of 1/4" with:
  - 1. Dow Corning Fire Stop Foam
  - 2. Pensil 200
  - 3. IPC flame safe FS-1900
  - 4. Tremco "Tremstop 1A"

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Follow manufacturer's installation instructions explicitly.
- B. Seal penetrations of ductwork, piping, and other mechanical equipment through one-hour and two-hour rated partitions as shown on Architectural and Mechanical Drawings.
- C. Install fire stopping material on clean surfaces to assure adherence.

**END OF SECTION 220800**

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## **SECTION 221114-- PROPANE GAS SYSTEMS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, and Section 22 0501 apply to this Section.

#### **1.2 SUMMARY**

- A. Furnish and install gas piping and fittings within building including connection to meter.

#### **1.3 QUALITY ASSURANCE**

- A. Qualifications:
  - 1. Welders shall be certified and bear evidence of certification 30 days prior to commencing work on project. If there is doubt as to proficiency of welder, Owner's Representative may require welder to take another test. This shall be done at no cost to Owner. Certification shall be by Pittsburgh Testing Laboratories or other approved authority.

### **PART 2 - PRODUCTS**

#### **2.1 PIPE**

- A. Meet requirements of ASTM A 53-89a, "Specification for Pipe, Steel, Black & Hot-Dipped Zinc-Coated Welded & Seamless".
- B. Carbon steel, butt welded, Schedule 40 black steel pipe.

#### **2.2 FITTINGS**

- A. Black Pipe:
  - 1. Welded forged steel fittings meeting requirements of ASTM A 234-89a, "Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures", or standard weight malleable iron screwed.

#### **2.3 GAS PRESSURE REGULATOR**

- A. Self- operated, spring loaded regulator with large diaphragm area.
- B. Internal registration and relief.
- C. Tamper-resistant adjustment with corrosion resistance for indoor or outdoor use.
- D. Install with manual shut off cock.
- E. Emerson Y600AR or approved equal.

#### **2.4 VALVES**

- A. 125 psi bronze body ball valve, UL listed
- B. Approved Manufacturers & Models:
  - 1. ConBraCo - "Apollo" series 80-100
  - 2. Jenkins - FIG-30-A
  - 3. Jomar - Model T-204
  - 4. McDonald - 3410
  - 5. PGL Corp - "Red Cap" gas ball valve
  - 6. Watts - Model B-6000-UL

## 2.5 PRESSURE REDUCING REGULATORS

- A. Corrosion Resistant Brass Body.
- B. 1/2" to 4" Threaded NPT
- C. 2" and Above Flanged.
- D. Max Inlet Pressure 10 psi.
- E. Max Outlet Pressure 0.5 psi.
- F. Temperature Capabilities - ~20 to 180° F.
- G. Approved Manufactures and Models.
  - 1. Emerson Process Management.
  - 2. Maxitrol 3UP33
  - 3. Or approved equal.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Pipe installed underground, through air plenums, in walls, and pipes 2-1/2 inches and larger shall have welded fittings and joints. Other pipe may have screwed or welded fittings.
- B. Wrap and lay underground pipe in accordance with local gas utility company regulations and specifications.
- C. Install gas cocks on lines serving boilers, furnaces, duct heaters, and water heaters adjacent to boiler, furnace, or heater on outside of boiler, furnace, or heater cabinet and easily accessible.
- D. Do not use flexible pipe connections to boilers, furnaces, duct heaters, or hot water heaters.
- E. Install dirt leg with pipe cap, 6 inches long minimum, on each vertical gas drop to heating equipment.
- F. Use fittings for changes of direction in pipe and for branch runouts.
- G. Paint exterior exposed gas piping with gray paint to match gas meter.

**END OF SECTION 221114**

## **SECTION 22 1116-- POTABLE WATER PIPING SYSTEMS (PEX)**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes ASTM F877 cross-linked polyethylene (PEX) tubing hot and cold water distribution systems, ASTM F876 cross-linked polyethylene (PEX) tube, ASTM F1807 fittings and ASTM F2159 fittings

#### **1.2 REFERENCES**

- A. ASTM International
  - 1. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
  - 2. ASTM F876 Standard Specification for Cross-linked Polyethylene (PEX) Tubing.
  - 3. ASTM F877 Standard Specification for Cross-linked Polyethylene (PEX) Plastic Hot and Cold Water Distribution Systems
  - 4. ASTM F1807 Standard Specification for Metal Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-linked Polyethylene (PEX) Tubing
  - 5. ASTM F2159 Standard Specification for Plastic Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-linked Polyethylene (PEX) Tubing
- B. National Sanitation Foundation (NSF)
  - 1. Standard 14 Plastics Piping System Components and Related Materials
  - 2. Standard 61 Drinking Water System Components – Health Effects
- C. International Code Council (ICC)
  - 1. International Mechanical Code
  - 2. International Plumbing Code
- D. International Association of Plumbing Officials (IAPMO)
  - 1. Uniform Plumbing Code
  - 2. Uniform Mechanical Code
- E. Plastic Pipe Institute (PPI)
  - 1. Technical Report TR-3 Policies and Procedures for Developing Recommended Hydrostatic Design Stresses for Thermoplastic Pipe Materials.
  - 2. Technical Report TR-4 Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Piping and Fitting Compounds

#### **1.3 SYSTEM DESCRIPTION**

- A. A. Design Requirements
  - 1. Standard Grade hydrostatic pressure ratings from the Plastic Pipe Institute in accordance with TR-3 and listed in TR-4. The following three standard-grade hydrostatic ratings are required;
    - a. 200 degrees F at 80 psi
    - b. 180 degrees F at 100 psi
    - c. 73 degrees F at 160 psi
  - 2. Tubing tested in general accordance with ASTM E84 for a flame spread/smoke developed index of 25/50 or less for the following PEX tube sizes encased with ½ inch fiberglass insulation;
    - a. 1 ¼ inch
    - b. 1 ½ inch
    - c. 2 inch
  - 3. Tubing tested in general accordance with ASTM E84 for a flame spread/smoke developed index of 25/50 or less for the following PEX tube sizes;
    - a. 3/8 inch
    - b. ½ inch
    - c. 5/8 inch
    - d. ¾ inch
    - e. 1 inch
- B. Performance Requirements

1. To provide a PEX tubing hot and cold potable water distribution system, which is manufactured, fabricated and installed to comply with regulatory agencies and to maintain performance criteria stated by the PEX tubing manufacturer without defects, damage or failure
  - a. Comply with NSF Standard 14
  - b. Comply with NSF Standard 61
  - c. Show compliance with ASTM F877

#### **1.4 SUBMITTALS**

- A. General
  1. Upon request, submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section
- B. Product Data
  1. Upon request, submit manufacturer's product submittal data and installation instructions
  2. Upon request, submit manufacturer's Professional Installation Limited Warranty
- C. Shop Drawings
  1. Upon request, provide installation drawings indicating tubing layout, manifold locations, plumbing fixtures supported and schedules with details required for installation of the system
- D. Samples
  1. Upon request, submit selection and verification samples of piping
- E. Listing Certifications
  1. Upon request, submit manufacturers third party listings

#### **1.5 QUALITY ASSURANCE**

- A. Installer Qualifications
  1. Utilize an installer having demonstrated experience on projects of similar size and complexity and possesses the skills and knowledge to install a PEX potable water distribution system
  2. Installer will utilize skilled workers holding a trade qualification license or equivalent or apprentices under the supervision of a licensed tradesperson
- B. Pre-installation Meetings
  1. Verify project timeline requirements
  2. Manufacturer's installation instruction
  3. Manufacturer's warranty requirements

#### **1.6 DELIVERY, STORAGE AND HANDLING**

- A. General
  1. Comply with Division 1 Product Requirement Section
- B. Delivery
  1. Deliver materials in manufacture's original, unopened, undamaged containers with identification labels intact until ready for installation
- C. Storage and Protection
  1. Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer
  2. Store PEX tubing indoors, in cartons or under cover to avoid dirt or foreign material from entering the tubing
  3. Do not expose PEX tubing to direct sunlight for more than six months. If construction delays are encountered, cover the tubing that is exposed to direct sunlight

#### **1.7 WARRANTY**

- A. Project Warranty
  1. Refer to Conditions of the Contract for project warranty provisions
- B. Manufacturer's Warranty
  1. Shall cover the repair or replacement of properly installed tubing and fittings proven defective as well as incidental damages

2. Warranty period for PEX tubing and subsequent system shall be 25 year non-prorated warranty against failure due to defect in material or workmanship, beginning with the date of installation
3. It is the installer's responsibility to avoid mixing fittings manufactured by others as it will reduce the owner's warranty

## **PART 2 - PRODUCTS**

### **2.1 PRODUCT MANUFACTURERS**

- A. Zurn
- B. Uponor
- C. Vanguard
- D. Rehau
- E. Viega

### **2.2 MATERIALS**

- A. Tubing
  1. Cross-linked polyethylene (PEX).
  2. Non-barrier type.
    - a. Shall have a pressure and temperature rating of 160 PSI at 73°F, 100 PSI at 180°F and 80 PSI at 200°F.
    - b. Tubing shall have a minimum of 6 months UV protection.
  3. Manufactured in accordance with ASTM F876 and ASTM F877 and tested for compliance by an independent third-party agency.
- B. Fittings
  1. Manufactured in accordance with ASTM F1807 or ASTM F2159 and/or comply with ASTM F877 system standard as identified on the fitting
- C. Manifold
  1. Preassembled Manifold
  2. Copper Manifold System
  3. Multi Port Fittings
  4. Copper Manifold Header
- D. Valves
  1. Shall be of the metal type, meeting the requirements of ASTM F877, identified as such with the appropriate mark on the product

## **PART 3 - EXECUTION**

### **3.1 MANUFACTURER'S INSTRUCTIONS**

- A. A. Comply with manufacture's product data, including product technical bulletins, technical memo's, installation instructions and design drawings.

### **3.2 EXAMINATION**

- A. Site Verification of Conditions
  1. Verify that site conditions are acceptable for the installation of the PEX potable water system
  2. Do not proceed with installations of the PEX potable water system until unacceptable conditions are corrected

### **3.3 INSTALLATION**

- A. Install PEX tubing in accordance with tubing manufacturer's recommendations and as indicated in the PEX Plumbing Installation Guide
- B. Do not install PEX tubing within 6 inches of gas appliance vents or within 12 inches of any recessed light fixtures
- C. Do not solder within 18 inches of PEX tubing in the same waterline. Make sweat connections prior to making PEX connections

- D. Ensure no glues, solvents, sealants or chemicals come in contact with the tubing without prior permission from the tubing manufacturer
- E. Do not expose PEX tubing to direct sunlight for more than 6 months
- F. Use grommets or sleeves at the penetration for PEX tubing passing through metal studs
- G. Use a PEX manufacturer recommended fire stop sealant manufacturer
- H. Protect PEX tubing with sleeves where abrasion may occur
- I. Use nail plates where PEX tubing penetrates wall stud or joists and has the potential for being struck with a screw or nail
- J. Allow slack of approximately 1/8 inch per foot of tube length to compensate for expansion and contraction
- K. Minimum horizontal supports are to be installed not less than 32 inches between hangers in accordance with model plumbing codes.
- L. Pressurize PEX tubing in accordance with applicable codes or in the absence of applicable codes, test pressure shall be at least equal to normal system working pressure, but not less than 40 PSI water or air and not greater than 225 PSI water, 125 PSI air

### **3.4 FIELD QUALITY CONTROL**

- A. Site Tests
  - 1. To ensure system integrity, pressure test the system before covering tubing in concrete and after other trades have worked in the vicinity of the tubing
  - 2. Repair and replace any product that has been damaged according to manufacturer's recommendation

### **3.5 PROTECTION**

- A. Protect installed work from damage due to subsequent construction activity on the site

**END OF SECTION 221116**

## **SECTION 221118 – BACKFLOW PREVENTER VALVE**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 22 05 01 apply to this Section.

#### **1.2 SUMMARY**

- A. Furnish and install a backflow preventer valve as described in Contract Documents.

### **PART 2 - PRODUCTS**

#### **2.1 MANUFACTURED UNITS**

- A. Designed to provide separation of radiant hot water heating system water from domestic cold water supply in accordance with Code.
  - 1. Rated flow at 30 psi pressure drop rated for 175 psi inlet pressure and 140 deg. F maximum operating temperature.
  - 2. Brass body construction with 3/4 inch NPT connections.
- B. Approved Manufacturers:
  - 1. Beeco 12
  - 2. Watts 900
  - 3. Equal by Febco
  - 4. Equal by Conbraco

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Furnish and install a drain cup and pipe the waste line to the nearest floor drain or floor sink.

**END OF SECTION 221118**

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## **SECTION 221313 – SOIL, WASTE, & VENT PIPING SYSTEMS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 22 05 01 apply to this Section.

#### **1.2 SUMMARY**

- A. Furnish and install soil, waste, and vent piping systems within building and connect with outside utility lines 5 feet out from building where applicable.
- B. Perform excavation and backfill required by work of this Section.

### **PART 2 - PRODUCTS**

#### **2.1 BURIED LINES**

- A. Service weight, single-hub type cast iron soil pipe and fittings meeting requirements of ASTM A 74-87, "Specification for Cast Iron Soil Pipe & Fittings".
  - 1. Joint Material:
    - a. Rubber gaskets meeting requirements of ASTM C 564-88, "Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings".
    - b. No hub stainless steel clamps with neoprene gasket.
- B. ABS-DWV or PVC-DWV plastic waste pipe and fittings as permitted by state and local plumbing code.

#### **2.2 ABOVE GRADE PIPING & VENT LINES**

- A. Same as specified for buried lines except no-hub pipe may be used.
- B. Vent lines 2-1/2 inches or smaller may be Schedule 40 galvanized steel.
- C. Joint Material:
  - 1. Bell & Spigot Pipe - rubber gaskets meeting requirements of ASTM C 564-88, "Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings".
  - 2. No-Hub Pipe - Neoprene gaskets with stainless steel cinch bands.
  - 3. Galvanized Pipe - Screwed Durham tarred drainage fittings, or Victaulic.
  - 4. ABS-DWV solvent weld fittings

#### **2.3 TRAP PRIMERS**

- A. Components:
  - 1. Drains And Drain Accessories:
    - a. Floor Drain FD-1:
      - 1) Approved types with deep seal trap and chrome plated strainer.
      - 2) Provide trap primer connection and trap primer equal to Sioux Chief 695-01.
      - 3) Category Four Approved Products. See Section 01 6200 for definitions of Categories:
        - a) Josam: 30000-50-Z-5A.
        - b) J. R. Smith: 2010-A.
        - c) Sioux Chief: 832.
        - d) Wade: 1100.
        - e) Watts: FD-200-A.
        - f) Zurn: Z-415.

#### **2.4 TRENCH DRAINS**

- A. The surface drainage shall be JR Smith, Zurn, ACO, or approved equal, complete with heavy duty grating secured with "quick loc" fasteners.

- B. The trench system bodies shall be manufactured from polyester polymer concrete with minimum properties as follows:
1. Compressive Strength – 14,000 psi
  2. Flexural Strength – 4,000 psi
  3. Water absorption – 0.07%
  4. Frost proof, salt proof, and dilute acid and alkali resistant.
- C. The nominal clear opening shall be 4" with an overall width of 5 ½". Pre-cast units shall be manufactured with an invert slope of 0.5 % and a wall thickness of 0.5". Each unit will feature a partial radius in the trench bottom, and male to female interconnecting end profile units shall have horizontal cast in anchoring keys on the outside wall to insure maximum bond to the surrounding bedding material and pavement surface. The galvanized steel edge rail will be integrally cast in. Each rail shall be 3/32" thick.
- D. Grades shall be heavy duty traffic rated. After removal of grates and "quick-loc" bar there shall be un-interrupted access to the trench to aid maintenance.
- E. The Trench Drain system shall be installed in accordance with the manufactures' installation instructions and recommendations.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Do not caulk threaded work.
- B. Slope horizontal pipe at 1/4 in/ft.
- C. Cleanouts:
1. Provide and set full size cleanouts at foot of each riser, and ends of branches from toilets, at points where a change of direction occurs, on exposed and accessible traps, at points where required to remove rust accumulation or other obstructions and as shown on plans. Set screw cap in cleanout with graphite paste. Cleanouts in walls shall be flush and covered with a chrome plated cleanout cover screwed into the cleanout plug. Cleanouts in floors shall be flush using Zurn, Josam, or Wade floor level cleanout fittings. Location of all cleanouts subject to approval of inspector.
- D. Each fixture and appliance discharging water into sanitary sewer or building sewer lines shall have seal trap in connection with complete venting system so gasses pass freely to atmosphere with no pressure or syphon condition on water seal.
- E. Vent entire waste system to atmosphere. Discharge 14 inches above roof. Join lines together in fewest practicable number before projecting above roof. Set back vent lines so they will not pierce roof near edge or valley.
- F. Use torque wrench to obtain proper tension in cinch bands when using hubless cast iron pipe. Butt ends of pipe against centering flange of coupling.
- G. Flash pipes passing through roof with 16 oz sheet copper flashing fitted snugly around pipes and calk between flashing and pipe with flexible waterproof compound. Flashing base shall be at least 24 inches square.
1. Flashing may be 4 lb per sq ft lead flashing fitted around pipes and turned down into pipe 1/2 inch with turned edge hammered against pipe wall.

#### **3.2 FIELD QUALITY CONTROL**

- A. Before piping is covered, conduct tests for leaks and defective work. Notify Architect prior to testing. Correct leaks and defective work. Fill waste and vent system to roof level with water, 10 feet minimum, and show no leaks for two hours.

### **END OF SECTION 221313**

## **SECTION 223413 - ELECTRIC INSTANTANEOUS WATER HEATERS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, and Section 22 05 00 apply to this Section.

#### **1.2 SUMMARY**

- A. Furnish and install water heater as specified in Contract Documents.

#### **1.3 SUBMITTALS**

- A. Warranty:
  - 1. Submit copy of specified warranty.

### **PART 2 - PRODUCTS**

#### **2.1 MANUFACTURED UNITS**

- A. Materials:
  - 1. Instantaneous Type:
    - a. UL listed.
    - b. 110-120 V, single phase, 1500 watts maximum heating capacity.
    - c. Thermostatic control with adjustable setting.
    - d. Category Four Approved Product. See Section 01 6200 for definitions of Categories.
      - 1) Eemax SP 2412.
      - 2) Stiebel Eltron Mini 3.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Follow local plumbing code.

#### **3.2 WATER TEMPERATURE**

- A. Contractor shall be responsible to verify and/or change temperature settings on water heaters supplied on this project to meet requirements of Life Safety and Health Department Codes. Any setting above 120 deg. F. shall require warning labels placed on outside of water heaters in conspicuous places indicating water temperature setting and fact that any temperature above 120 deg. F. may be a hazard.

**END OF SECTION 223413**

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## **SECTION 224001 – PLUMBING FIXTURES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 22 0501 apply to this Section.

#### **1.2 SUMMARY**

- A. Furnish and install plumbing fixtures as described in Contract Documents.
- B. Before fixtures are ordered, the Contractor shall submit a complete list of plumbing fixtures, giving the catalog number, cut and make, for approval. Fixtures shall not be ordered until this list is approved.

### **PART 2 - PRODUCTS**

#### **2.1 GENERAL**

- A. Interior exposed pipe, valves, and fixture trim shall be chrome plated.
- B. Do not use flexible water piping.
- C. Flow Control Fittings:
  - 1. Vandal proof type and fit faucet spout of fixture used. Flow shall be controlled as required by local codes.
- D. Furnish and install the necessary plumbing fixtures in quantity as shown on plans. Provide all necessary valves, chrome plated 17 gauge or cast "P" traps, stops with risers, fittings, and accessories to make the job complete with the fixtures specified on the drawings. Exposed stops to be equal to Brasscraft with compression inlet, chrome plated nipples, cross handles, ¼ turn ball valves and flexible risers.
- E. Fixtures shall be PROFLO, Kohler, Crane, Briggs, Eljer, American Standard, or an approved equal. Specialties shall be Zurn, Josam, MiFab, J. R. Smith, Wade, or Watts.
- F. Toilet seat manufacturers shall be Beneke, Church, Olsonite, or Bemis.
- G. Carrier and wall hydrant manufacturers shall be Smith, Zurn, Wade, Josam, or Watts.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Install fixtures including traps and accessories with accessible stop or control valve in each hot and cold water branch supply line.
- B. Make fixture floor connections with approved brand of cast iron floor flange, soldered or casked securely to waste pipe.
- C. Make joints between fixtures and floor flanges tight with approved fixture setting compound or gaskets.
- D. Caulk between fixtures and wall and floor with white butyl rubber non-absorbent caulking compound. Point edges.
- E. Cleanouts: Provide and set full size cleanouts at foot of each riser, and ends of branches from toilets, at points where a change of direction occurs, on exposed and accessible traps, at points where required to remove rust accumulation or other obstructions and as shown on plans. Set screw cap in cleanout with graphite paste. Location of all cleanouts subject to approval of inspector.
- F. Traps: Install "P" traps in branch lines from floor drains or where required. Traps installed in connection with threaded pipe shall be recess drainage pattern. Traps installed in connection with cast iron pipe shall be of the same quality and grade as the pipe. Traps installed in connection with fixtures shall have a seal of not less than 2" nor

more than 4". Exposed traps shall be chrome plated cast brass or chrome plated 17 gauge tubular type. Provide trap primers as required by Code.

### **3.2     FIXTURE INSTALLATION**

- A.     Provide stop valves and 18" minimum air chambers on all water connections to fixtures. Furnish and install wall carriers for wall mounted fixtures, wood backing, where necessary, to be installed by General Contractor at the direction of this Contractor. Provide exact locations, including proper mounting heights, obtained from details on drawings and from manufacturer's specifications. Provide hudee rims for countertop installations.
- B.     Interior exposed pipe, valves, and fixtures trim shall be chrome plated.
- C.     Complete installation of each fixture including trap and accessories with accessible stop or control valve in each hot and cold water branch supply line. Make fixture floor connections with approved brand of cast iron floor flange, soldered or caulked securely to waste pipe. Make joint between fixture and floor flange tight with approved fixture setting compound or gaskets.
- D.     Polish chrome finish at completion of project.
- E.     Caulk between fixtures and wall and floor with white butyl rubber non-absorbent caulking compound. Paint all edges.
- F.     Install fixtures and fittings as per local codes and manufacturer's instructions.

**END OF SECTION 224001**

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## **SECTION 230501 – COMMON HVAC REQUIREMENTS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

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

#### **1.2 SUMMARY**

- A. Furnish labor, materials, and equipment necessary for completion of work as described in Contract Documents.
- B. It is the intent of these specifications that the systems specified herein are to be complete and operational before being turned over to the owner. During the bidding process, the contractor is to ask questions or call to the engineer's attention any items that are not shown or may be required to make the system complete and operational. Once the project is bid and the contractor has accepted the contract, it is his responsibility to furnish and install all equipment and parts necessary to provide a complete and operational system without additional cost to the owner.
- C. Furnish and install fire stopping materials to seal penetrations through fire rated structures and draft stops.
- D. Includes But Not Limited To:
  - 1. General procedures and requirements for HVAC.

#### **1.3 SUBMITTALS**

- A. Substitutions: By specific designation and description, standards are established for specialties and equipment. Other makes of specialties and equipment of equal quality will be considered provided such proposed substitutions are submitted to the Architect for his approval, complete with specification data showing how it meets the specifications, at least 5 working days prior to bid opening. A list of approved substitutions will be published as an addendum.
  - 1. Submit a single copy of Manufacturer's catalog data including Manufacturer's complete specification for each proposed substitution.
  - 2. The Architect or Engineer is to be the sole judge as to the quality of any material offered as an equal.
- B. Product Data, Shop Drawings: Within 30 days after award of contract, submit 10 sets of Manufacturer's catalog data for each manufactured item.
  - 1. Literature shall include enough information to show complete compliance with Contract Document requirements.
  - 2. Mark literature to indicate specific item with applicable data underlined.
  - 3. Information shall include but not be limited to capacities, ratings, type of material used, guarantee, and such dimensions as are necessary to check space requirements.
  - 4. When accepted, submittal shall be an addition to Contract Documents and shall be in equal force. No variation shall be permitted.
  - 5. Even though the submittals have been accepted by the Engineer, it does not relieve the contractor from meeting all of the requirements of the plans and specifications and providing a complete and operational system.
- C. Drawings of Record: One complete sets of blue line mechanical drawings shall be provided for the purpose of showing a complete picture of the work as actually installed.
  - 1. These drawings shall serve as work progress report sheets. Contractor shall make notations neat and legible therein daily as the work proceeds.
  - 2. The drawings shall be kept at the job at a location designated by the Mechanical Engineer.
  - 3. At completion of the project these "as-built" drawings shall be signed by the Contractor, dated, and returned to the Architect.
- D. Operating Instructions and Service Manual: The Mechanical Contractor shall prepare 2 copies of an Operation and Maintenance Manual for all mechanical systems and equipment used in this project. Manuals shall be bound in hard-backed binders and the front cover and spine of each binder shall indicate the name and location of the project. Use plastic tab indexes for all sections. Provide a section for each different type of equipment item. The following items shall be included in the manual, together with any other pertinent data. This list is not complete and is to be used as a guide.
  - 1. Provide a master index at the beginning of the manual showing all items included.
  - 2. The first section of the manual shall contain:



- a. Names, addresses, and telephone numbers of Architect, Mechanical Engineer, Electrical Engineer, General Contractor, Plumbing Contractor, Sheet Metal Contractor, and Temperature Control Contractor.
  - b. List of Suppliers which shall include a complete list of each piece of equipment used with the name, address, and telephone number of vendor.
  - c. General Description of Systems including –
    - 1) Location of all major equipment
    - 2) Description of the various mechanical systems
    - 3) Description of operation and control of the mechanical systems
    - 4) Suggested maintenance schedule
  - d. Copy of contractor's written warranty
  - 3. Provide a copy of approved submittal literature for each piece of equipment.
  - 4. Provide maintenance and operation literature published by the manufacturer for each piece of equipment which includes: oiling, lubrication and greasing data; belt sizes, types and lengths; wiring diagrams; step-by-step procedure to follow in putting each piece of mechanical equipment in operation.
  - 5. Include parts numbers of all replaceable items.
  - 6. Provide control diagram and operation sequence, along with labeling of control piping and instruments to match diagram.
  - 7. Include a valve chart indicating valve locations.
- E. Include air balance and/or water balance reports.

#### **1.4 SUBMITTALS FOR COMMON HVAC REQUIREMENTS**

- A. Samples: Sealer and gauze proposed for sealing ductwork.
- B. Quality Assurance / Control:
  - 1. Manufacturer's installation manuals providing detailed instructions on assembly, joint sealing, and system pressure testing for leaks.
  - 2. Specification data on sealer and gauze proposed for sealing ductwork.
- C. Quality Assurance
  - 1. Requirements: Construction details not specifically called out in Contract Documents shall conform to applicable requirements of SMACNA HVAC Duct Construction Standards.
  - 2. Pre-Installation Conference: Schedule conference immediately before installation of ductwork.

#### **1.5 QUALITY ASSURANCE**

- A. Requirements of Regulatory Agencies:
  - 1. Perform work in accordance with applicable provisions of local and state Plumbing Code, Gas Ordinances, and adoptions thereof. Provide materials and labor necessary to comply with rules, regulations, and ordinances.
  - 2. In case of differences between building codes, state laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern. Promptly notify Architect in writing of such differences.
- B. Applicable Specifications: Referenced specifications, standards, and publications shall be of the issues in effect on date of Advertisement for Bid.
  - 1. "Heating, Ventilating and Air Conditioning Guide" published by the American Society of Heating and Air Conditioning Engineers.
  - 2. "Engineering Standards" published by the Heating, Piping, and Air Conditioning Contractors National Association.
  - 3. "2012 International Building Code", "2012 International Mechanical Code", and "2012 International Fire Code" as published by the International Conference of Building Officials.
  - 4. 2012 International Plumbing Code as published by the International Association of Plumbing and Mechanical Officials.
  - 5. "National Electrical Code" as published by the National Fire Protection Association.
  - 6. "2012 International Energy Conservation Code".
- C. Identification: Motor and equipment name plates as well as applicable UL and AGA labels shall be in place when Project is turned over to Owner.

#### **1.6 INSPECTIONS AND PERMITS**

- A. Pay for permits, fees, or charges for inspection or other services. Local and state codes and ordinances must be properly executed without expense to Owner and are considered as minimum requirements. Local and state codes

and ordinances do not relieve the Contractor from work shown that exceeds minimum requirements.

## **1.7 ADDITIONAL WORK:**

- A. Design is based on equipment as described in the drawing equipment schedule. Any change in foundation bases, electrical wiring, conduit connections, piping, controls and openings required by alternate equipment submitted and approved shall be paid for by this division. All work shall be in accordance with the requirements of the applicable sections.

## **PART 2 - PRODUCTS FOR COMMON HVAC REQUIREMENTS**

- A. Finishes, Where Applicable: Colors as selected by Architect.
- B. Duct Hangers:
  - 1. One inch 25 mm by 18 ga 1.27 mm galvanized steel straps or steel rods as shown on Drawings, and spaced not more than 96 inches 2 400 mm apart. Do not use wire hangers.
  - 2. Attaching screws at trusses shall be 2 inch 50 mm No. 10 round head wood screws. Nails not allowed.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Site Inspection:
  - 1. Examine premises and understand the conditions which may affect performance of work of this Division before submitting proposals for this work.
  - 2. No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.
- B. Drawings:
  - 1. Mechanical drawings show general arrangement of piping, ductwork, equipment, etc, and do not attempt to show complete details of building construction which affect installation. This Contractor shall refer to architectural, structural, and electrical drawings for additional building detail which affect installation of his work.
    - a. Follow mechanical drawings as closely as actual building construction and work of other trades will permit.
    - b. No extra payments will be allowed where piping and/or ductwork must be offset to avoid other work or where minor changes are necessary to facilitate installation.
    - c. Everything shown on the mechanical drawings shall be the responsibility of Mechanical Contractor unless specifically noted otherwise.
  - 2. Consider architectural and structural drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over mechanical drawings.
  - 3. Because of small scale of mechanical drawings, it is not possible to indicate all offsets, fittings, and accessories which may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions. Do not scale drawings for locations of equipment or piping. Refer to large scale dimensioned drawings for exact locations.
- C. Insure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of Contract Documents.
  - 1. If approval is received to use other than specified items, responsibility for specified capacities and insuring that items to be furnished will fit space available lies with this Division.
  - 2. If non-specified equipment is used and it will not fit job site conditions, this Contractor assumes responsibility for replacement with items named in Contract Documents.

### **3.2 PREPARATION**

- A. Cut carefully to minimize necessity for repairs to existing work. Do not cut beams, columns, or trusses.
  - 1. Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown. Surface finishes shall exactly match existing finishes of same materials.
  - 2. Each Section of this Division shall bear expense of cutting, patching, repairing, and replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it.
  - 3. Cutting, patching, repairing, and replacing pavements, sidewalks, roads, and curbs to permit installation of work of this Division is responsibility of Section installing work.

### **3.3 INSTALLATION**

- A. Arrange pipes, ducts, and equipment to permit ready access to valves, unions, traps, starters, motors, control components, and to clear openings of doors and access panels.

### **3.4 STORAGE AND PROTECTION OF MATERIALS:**

- A. Provide storage space for storage of materials and assume complete responsibility for losses due to any cause whatsoever. Storage shall not interfere with traffic conditions in any public thoroughfare.
- B. Protect completed work, work underway, and materials against loss or damage.
- C. Close pipe openings with caps or plugs during installation. Cover fixtures and equipment and protect against dirt, or injury caused by water, chemical, or mechanical accident.

### **3.5 EXCAVATION AND BACKFILL**

- A. Perform necessary excavation of whatever substance encountered for proper laying of all pipes and underground ducts.
  - 1. Excavated materials not required for fill shall be removed from site as directed by Engineer.
  - 2. Excavation shall be carried low enough to allow a minimum coverage over underground piping of 5'-0" or to be below local frost level.
  - 3. Excess excavation below required level shall be backfilled at Contractor's expense with earth, sand, or gravel as directed by Engineer. Tamp ground thoroughly.
  - 4. Ground adjacent to all excavations shall be graded to prevent water running into excavated areas.
- B. Backfill pipe trenches and allow for settlement.
  - 1. Backfill shall be mechanically compacted to same density as surrounding undisturbed earth.
  - 2. Cinders shall not be used in backfilling where steel or iron pipe is used.
  - 3. No backfilling shall be done until installation has been approved by the Engineer.

### **3.6 COOPERATION**

- A. Cooperate with other crafts in coordination of work. Promptly respond when notified that construction is ready for installation of work under Division 23000. Contractor will be held responsible for any delays which might be caused by his negligence or failure to cooperate with the other Contractors or crafts.

### **3.7 SUPERVISION**

- A. Provide a competent superintendent in charge of the work at all times. Anyone found incompetent shall be removed at once and replaced by someone satisfactory, when requested by the Architect.

### **3.8 INSTALLATION CHECK:**

- A. An experienced, competent, and authorized representative of the manufacturer or supplier of each item of equipment indicated in the equipment schedule shall visit the project to inspect, check, adjust if necessary, and approve the equipment installation. In each case, the equipment supplier's representative shall be present when the equipment is placed in operation. The equipment supplier's representative shall revisit the project as often as necessary until all trouble is corrected and the equipment installation and operation is satisfactory to the Engineer.
- B. Each equipment supplier's representative shall furnish to the Owner, through the Engineer, a written report certifying the following:
  - 1. Equipment has been properly installed and lubricated.
  - 2. Equipment is in accurate alignment.
  - 3. Equipment is free from any undue stress imposed by connecting piping or anchor bolts.
  - 4. Equipment has been operated under full load conditions.
  - 5. Equipment operated satisfactorily.
- C. All costs for this installation check shall be included in the prices quoted by equipment suppliers.

### **3.9 CLEANING EQUIPMENT AND PREMISES**

- A. Properly lubricate equipment before Owner's acceptance.

- B. Clean exposed piping, ductwork, equipment, and fixtures. Repair damaged finishes and leave everything in working order.
- C. Remove stickers from fixtures and adjust flush valves.
- D. At date of Substantial Completion, air filters shall be new, clean, and approved by Owner's representative.
- E. Trap elements shall be removed during cleaning and flushing period. Replace trap elements and adjust after cleaning and flushing period.

### **3.10 TESTS**

- A. No piping work, fixtures, or equipment shall be concealed or covered until they have been inspected and approved by the inspector. Notify inspector when the work is ready for inspection.
- B. All work shall be completely installed, tested as required by Contract Documents and the city and county ordinances and shall be leak-tight before the inspection is requested.
- C. Tests shall be repeated to the satisfaction of those making the inspections.
- D. Water piping shall be flushed out, tested at 100 psi and left under pressure of supply main or a minimum of 40 psi for the balance of the construction period.

### **3.11 WARRANTY**

- A. Contractor shall guarantee work under Division 23 to be free from inherent defects for a period of one year from acceptance.
  - 1. Contractor shall repair, revise or replace any and all such leaks, failure or inoperativeness due to defective work, materials, or parts free of charge for a period of one year from final acceptance, provided such defect is not due to carelessness in operation or maintenance.
  - 2. In addition, the Contractor shall furnish all refrigeration emergency repairs, emergency service and all refrigerant required due to defective workmanship, materials, or parts for a period of one year from final acceptance at no cost to the Owner, provided such repairs, service and refrigerant are not caused by lack of proper operation and maintenance.
- B. In addition to warranty specified in General Conditions, heating, cooling, and plumbing systems are to be free from noise in operation that may develop from failure to construct system in accordance with Contract Documents.

### **3.12 SYSTEM START-UP, OWNER'S INSTRUCTIONS**

- A. Off-Season Start-up
  - 1. If Substantial Completion inspection occurs during heating season, schedule spring start-up of cooling systems. If inspection occurs during cooling season, schedule autumn start-up for heating systems.
  - 2. Notify Owner 7 days minimum before scheduled start-up.
  - 3. Time will be allowed to completely service, test, check, and off-season start systems. During allowed time, train Owner's representatives in operation and maintenance of system.
  - 4. At end of off-season start-up, furnish Owner with letter confirming that above work has been satisfactorily completed.
- B. Owner's Instructions
  - 1. Instruct building maintenance personnel and Owner Representative in operation and maintenance of mechanical systems utilizing Operation & Maintenance Manual when so doing.
  - 2. Minimum instruction periods shall be as follows –
    - a. Mechanical - Four hours.
    - b. Temperature Control - Four hours.
    - c. Refrigeration - Two hours.
  - 3. Instruction periods shall occur after Substantial Completion inspection when systems are properly working and before final payment is made.
  - 4. None of these instructional periods shall overlap another.

### **3.13 PROTECTION**

- A. Do not run heat pump, air handling units, fan coil units, or other pieces of equipment used for moving supply air without proper air filters installed properly in system.

- B. The mechanical systems are not designed to be used for temporary construction heat. If any equipment is to be started prior to testing and substantial completion, such equipment will be returned to new condition with full one year warranties, from date of substantial completion after any construction use. This includes, but is not necessarily limited to: Equipment, filters, ductwork, fixtures, etc.

### **3.14 COMMON HVAC REQUIREMENTS:**

#### **A. INSTALLATION**

1. During installation, protect open ends of ducts by covering with plastic sheet tied in place to prevent entrance of debris and dirt.
2. Make necessary allowances and provisions in installation of sheet metal ducts for structural conditions of building. Revisions in layout and configuration may be allowed, with prior written approval of Architect. Maintain required airflows in suggesting revisions.
3. Hangers And Supports:
  - a. Install pair of hangers close to each transverse joint and elsewhere as required by spacing indicated in table on Drawings.
  - b. Install upper ends of hanger securely to floor or roof construction above by method shown on Drawings.
  - c. Attach strap hangers to ducts with cadmium-plated screws. Use of pop rivets or other means will not be accepted.
  - d. Where hangers are secured to forms before concrete slabs are poured, cut off flush all nails, strap ends, and other projections after forms are removed.
  - e. Secure vertical ducts passing through floors by extending bracing angles to rest firmly on floors without loose blocking or shimming. Support vertical ducts, which do not pass through floors, by using bands bolted to walls, columns, etc. Size, spacing, and method of attachment to vertical ducts shall be same as specified for hanger bands on horizontal ducts.

#### **B. CLEANING**

1. Clean interior of duct systems before final completion.

**END OF SECTION 230501**

## **SECTION 230712 - MECHANICAL INSULATION AND FIRE STOPPING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

#### **1.2 SUMMARY**

- A. Furnish and install mechanical insulation and fire stopping as described in Contract Documents including but not limited to the following:
  - 1. Fire Stopping

#### **1.3 QUALITY ASSURANCE**

- A. Insulation shall have composite (insulation, jacket or facing and adhesive used to adhere facing or jacket to insulation) fire and smoke hazard ratings as tested by Procedure ASTM E-84, NFPA 255 and UL 723 not exceeding: Flame Spread of 25 and Smoke Developed of 50.
- B. Insulation Contractor shall certify in writing, prior to installation, that all products to be used will meet the above criteria.
- C. Accessories, such as adhesives, mastics, cements, and tapes, for fittings shall have the same component ratings as listed above.
- D. Products, or their shipping cartons, shall bear a label indicating that flame and smoke ratings do not exceed above requirements.
- E. Any treatment of jacket or facings to impart flame and smoke safety shall be permanent.
- F. The use of water-soluble treatments is prohibited.

**END OF SECTION 230712**

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## **SECTION 230800 – FIRE STOPPING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

#### **1.2 SUMMARY**

- A. Furnish and install fire stopping as described in Contract Documents.

#### **1.3 QUALITY ASSURANCE**

- A. Fire stopping material shall meet ASTM E814, E84 and be UL listed.

### **PART 2 - PRODUCTS**

#### **2.1 MANUFACTURED UNITS**

- A. Material shall be flexible, long lasting, intumescent acrylic seal to accommodate vibration and building movement.
- B. Caulk simple penetrations with gaps of 1/4" or less with:
  - 1. Dow Corning Fire Stop Sealant
  - 2. Pensil 300
- C. Caulk multiple penetrations and/or penetrations with gaps in excess of 1/4" with:
  - 1. Dow Corning Fire Stop Foam
  - 2. Pensil 200
  - 3. IPC flame safe FS-1900
  - 4. Tremco "Tremstop 1A"

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Follow manufacturer's installation instructions explicitly.
- B. Seal penetrations of ductwork, piping, and other mechanical equipment through one-hour and two-hour rated partitions as shown on Architectural and Mechanical Drawings.
- C. Install fire stopping material on clean surfaces to assure adherence.

**END OF SECTION 230800**



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## **SECTION 233114 - LOW-PRESSURE STEEL DUCTWORK**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

#### **1.2 SUMMARY**

- A. Furnish and install above-grade ductwork and related items as described in Contract Documents.

### **PART 2 - PRODUCTS**

#### **2.1 DUCTS**

- A. Fabricate of zinc-coated lockforming quality steel sheets meeting requirements of ASTM 653A/653M, "Specification for Sheet Steel Zinc-Coated (Galvanized) by the Hot-Dip Process, Lock Forming Quality", with G 60 coating.
- B. Use of aluminum, non-metallic, or round ducts is not permitted. [Specification writer: Use of aluminum ducts in areas with high chlorine content (eg.: ventilation for pools, spas, etc.) should be considered on a per job basis.]

#### **2.2 DUCT JOINTS**

- A. Ducts with sides up to and including 36 inches shall be as detailed in the SMACNA manual.
- B. Duct sizes over 36 inches shall be fabricated using SMACNA T-24 flange joints or pre-fabricated systems as follows:
  - 1. Ducts with sides over 36 inches to 48 inches:
    - a. transverse duct joint system by Ductmate/25, Nexus, Ward, or WDCI (Lite) (SMACNA "E" or "G" Type connection).
  - 2. Ducts 48 inches & larger:
    - a. Ductmate/35, Nexus, or WDCI (Heavy) (SMACNA "J" Type connection).
  - 3. Approved Manufacturers:
    - a. Ductmate Industries Inc, 10760 Bay Meadows Drive, Sandy, UT 84092 (801) 571-5308
    - b. Nexus, Exanno Corp, P O Box 729, Buffalo, NY 14206 (716) 849-0545
    - c. Ward Industries Inc, 1661 Lebanon Church Road, Pittsburg, PA 15236 (800) 466-9374
    - d. WDCI, P O Box 10868, Pittsburg, PA 15236 (800) 245-3188

#### **2.3 ACCESS DOORS IN DUCTS**

- A. At each manual outside air damper and at each motorized damper, install factory built insulated access door with hinges and sash locks. Locate doors within 6 inches of installed dampers. Construction shall be galvanized sheet metal, 24 ga minimum.
- B. Fire and smoke damper access doors shall have a minimum clear opening of 12" x 12" or as specified on Drawings to easily service fire or smoke damper. Doors shall be within 6 inches of fire and smoke dampers and in Mechanical Room if possible.
- C. Identify each door with 1/2" high letters reading "smoke damper" or "fire damper".
- D. Approved Manufacturers:
  - 1. AirBalance - Fire/Seal #FSA 100
  - 2. Air Control Products - HAD-10
  - 3. Cesco-Advanced Air - HAD-10
  - 4. Elgen - Model 85 A
  - 5. Kees Inc - ADH-D.
  - 6. Louvers & Dampers - #SMD-G-F
  - 7. Nailor-Hart Industries Inc - Series 0831
  - 8. National Controlled Air Inc - Model AD-FL-1

## **2.4 FLEXIBLE EQUIPMENT CONNECTIONS**

- A. 30 oz closely woven UL approved glass fabric, double coated with neoprene.
- B. Fire retardant, waterproof, air-tight, resistant to acids and grease, and withstand constant temperatures of 250 deg F.
- C. Approved Manufacturers:
  - 1. Cain - N-100
  - 2. Duro Dyne - MFN
  - 3. Elgen - ZLN
  - 4. Ventfabrics - Ventglas

## **2.5 CONCEALED CEILING DAMPER REGULATORS**

- A. Approved Manufacturers:
  - 1. Cain
  - 2. Duro Dyne
  - 3. Metco Inc
  - 4. Vent-Lock - #666
  - 5. Young - #303

## **2.6 VOLUME DAMPERS**

- A. In Main Ducts:
  - 1. 16 gauge galvanized steel, opposed blade type with 3/8 inch pins and end bearings. Blades shall have 1/8 inch clearance all around.
  - 2. Damper shall operate within acoustical duct liner.
  - 3. Provide channel spacer equal to thickness of duct liner.
  - 4. Approved Manufacturers:
    - a. Air Balance - Model AC-2
    - b. Air Control Products - CD-OB
    - c. American Warming - VC-2-AA
    - d. Greenheck - VCD-1100
    - e. NCA, Safe Air
    - f. Vent Products - 5100
- B. In Sheet Metal Branch Ducts:
  - 1. Extruded aluminum, opposed blade type. When in open position, shall not extend beyond damper frame.
  - 2. Maximum blade length 12 inches.
  - 3. Damper Regulator shall be concealed type with operation from bottom or with 90 deg miter gear assembly from side.
  - 4. Approved Manufacturers:
    - a. Air Control Products - TCD-OB
    - b. Air Guide - OB
    - c. Arrow - OBDAF-207
    - d. CESCO - CDA
    - e. Reliable Metals - OBD-RO
    - f. Tuttle & Bailey - A7RDDM
    - g. Safe Air
    - h. Young - 820-AC
- C. Dampers above removable ceiling and in Mechanical Rooms shall have locking quadrant on bottom or side of duct. Otherwise, provide concealed ceiling damper regulator and cover plate.

## **2.7 BACKDRAFT DAMPER**

- A. Backdraft blades shall be nonmetallic and shall be neoprene coated fiberglass.
- B. Stop shall be galvanized steel screen or expanded metal, 1/2 inch mesh.
- C. Frame shall be galvanized steel or extruded aluminum alloy.
- D. Approved Models & Manufacturers:
  - 1. Air Control Products - FBD
  - 2. American Warming - BD-15

3. CESCO - FBD 101
4. Ruskin - NMS2
5. Safe Air

## 2.8 DUCT HANGERS

- A. 1" x 18 gauge galvanized steel straps or steel rods as shown on Drawings, and spaced not more than 8 feet apart. Do not use wire hangers.
- B. Attaching screws at trusses shall be 1-1/2 inch No. 10 round head wood screws. Nails not allowed.

## 2.9 DUCT SEALER

- A. Cain - Duct Butter or Butter Tak
- B. Design Polymeric - DP 1010
- C. DSC - Stretch Coat
- D. Duro Dyne - S2
- E. Hardcast - #601 Iron-Grip or Peel-N-Seal Tape
  1. Kingco - 15-325
  2. Mon-Eco - 44-41
  3. Trans-Continental Equipment Co - Multipurpose Duct Sealant
  4. United - Sheet Metal duct-sealer

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Ducts:
  1. Straight and smooth on inside with joints neatly finished unless otherwise directed.
  2. Duct panels through 48 inch dimension having acoustic duct liner need not be crossbroken or beaded.
  3. Crossbreak unlined ducts and duct panels larger than 48 inch or bead 12 inches on center.
  4. Securely anchor ducts to building structure with specified duct hangers attached with screws. Do not hang more than one duct from a duct hanger.
  5. Brace and install ducts so they shall be free of vibration under all conditions of operation.
  6. Ducts shall not bear on top of structural members.
  7. Make duct take-offs to branches, registers, grilles, and diffusers as detailed on Drawings.
  8. Ducts shall be large enough to accommodate inside acoustic duct liner. Dimensions shown on Drawings are net clear inside dimensions after duct liner has been installed.
  9. Properly flash where ducts protrude above roof.
  10. Install internal ends of slip joints in direction of flow. Make joints air tight using specified duct sealer.
  11. Cover horizontal and longitudinal joints on exterior ducts with two layers of Hardcast tape installed with Hardcast HC-20 adhesive according to Manufacturer's recommendations.
  12. Paint ductwork visible through registers, grilles, and diffusers flat black.
- B. Install flexible inlet and outlet duct connections to each furnace, fan, fan coil unit, and air handling unit.
- C. Install concealed ceiling damper regulators.
  1. Paint cover plates to match ceiling tile.
  2. Damper regulators will not be required for dampers located directly above removable ceilings or in Mechanical Rooms.
- D. Provide each take-off with an adjustable volume damper to balance that branch.
  1. Anchor dampers securely to duct.
  2. Install dampers in main ducts within insulation.
  3. Dampers in branch ducts shall fit against sheet metal walls, bottom and top of duct, and be securely fastened. Cut duct liner to allow damper to fit against sheet metal.
  4. Where concealed ceiling damper regulators are installed, provide a cover plate.
- E. Install grilles, registers, and diffusers. Level floor registers and anchor securely into floor.
- F. Air Turns:

1. Permanently installed, consisting of single thickness curved metal blades with one inch straight trailing edge to permit air to make abrupt turn without appreciable turbulence, in 90 degree elbows of above ground supply and return ductwork.
2. 4-1/2 inch wide minimum vane rail. Do not use junior vane rails.
3. Double thickness vanes not acceptable.
4. Quiet and free from vibration when system is in operation. See SMACNA Manual

G. Install motorized dampers

**END OF SECTION 233114**

## **SECTION 233400 - EXHAUST FANS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

#### **1.2 SUMMARY**

- A. Furnish and install exhaust fans as described in Contract Documents.

#### **1.3 QUALITY ASSURANCES**

- A. Requirements of Regulatory Agencies:
  - 1. Bear AMCA seal and UL label.

### **PART 2 - PRODUCTS**

#### **2.1 CEILING MOUNTED EXHAUST FANS**

- A. Acoustically insulated housings.
- B. Sound level rating of 4.6 sones maximum for fan RPM and CFM listed on Drawings.
- C. Include chatterproof integral back-draft damper with no metal to metal contact.
- D. True centrifugal wheels.
- E. Entire fan, motor, and wheel assembly shall be easily removable without disturbing housing.
- F. Suitably ground motors and mount on rubber-in shear vibration isolators.
- G. Provide wall or roof cap, as required.
- H. Approved Manufacturers:
  - 1. Cook-Gemini
  - 2. Greenheck Sp
  - 3. Pace
  - 4. Penn Zephyr

#### **2.2 WALL MOUNTED EXHAUST FANS**

- A. Direct drive or have adjustable pitch V-belt as noted on Drawings.
- B. Wheels shall be backward curved and housing shall be removable or hinged aluminum.
- C. Isolate motor with vibration dampeners.
- D. Provide quiet type back-draft dampers.
- E. Insulated, pre-fabricated metal wall curb.
- F. Approved Manufacturers:
  - 1. Fans:
    - a. Penn
    - b. Centri-Master
    - c. Cook
    - d. Greenheck G, GB

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Anchor fan units securely to structure or curb.

**END OF SECTION 233400**

## **SECTION 233713 - AIR OUTLETS & INLETS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

#### **1.2 SUMMARY**

- A. Furnish and install wall supply registers, transfer grilles, return air grilles, soffit grilles, ceiling diffusers, louvers connected to ductwork, and registers as described in Contract Documents.

### **PART 2 - PRODUCTS**

#### **2.1 GRILLES & REGISTERS**

- A. Approved Manufacturers:
  - 1. Price
  - 2. Anemostat
  - 3. Krueger
  - 4. Titus
  - 5. Tuttle & Bailey

#### **2.2 LOUVERS**

- A. Extruded aluminum, with blades welded or screwed into frames and 1/2 inch mesh 16 gauge aluminum bird screen.
- B. Frames shall have mitered corners.
- C. Louvers shall be recessed, flanged, stationary, or removable as noted on Drawings.
- D. Approved Manufacturers:
  - 1. Airolite
  - 2. American Warming
  - 3. Arrow
  - 4. Industrial Louvers
  - 5. Ruskin
  - 6. Vent Products

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Anchor securely into openings.
- B. Install with screws to match color and finish of grilles and registers.
- C. Touch-up any scratched finish surfaces.
- D. Install in accordance with manufacturer's instructions.
- E. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.
- F. Install diffusers to ductwork with air tight connection.
- G. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.
- H. Paint ductwork visible behind air outlets and inlets matte black. Refer to Section 09 9000.

### **END OF SECTION 233713**



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## **SECTION 235540 - ELECTRIC RADIANT WALL HEATERS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, and Section 23 0501 apply to this Section.

#### **1.2 SUMMARY**

- A. Furnish and install wall heaters as described in Contract Documents.

#### **1.3 QUALITY ASSURANCE**

- A. Units shall be UL listed and comply with NEC.

### **PART 2 - PRODUCTS**

#### **2.1 MANUFACTURED UNITS**

- A. Fan type for recess mounting in wall.
- B. 20 gauge minimum sheet metal casing.
- C. Heating element shall be encased in steel finned casting and protected by thermal switch.
- D. Fan motor shall be heavy duty enclosed and permanently lubricated.
- E. Fan shall be precision balanced and fan-motor assembly mounted to be vibration free.
- F. Units shall be controlled automatically by integral thermostat when heater is in "ON" position.
- G. Heater shall have built-in fan delay.
- H. Finish - Baked-on enamel.
- I. Approved Manufacturers:
  - 1. Q' Mark
  - 2. Berko
  - 3. Thermador
  - 4. Markel

**END OF SECTION 235540**

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## **SECTION 235725 – PROPANE GAS FIRED UNIT HEATERS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, General Provisions of Contract, including General and Supplementary Conditions and Section 23 0501 apply to this Section.

#### **1.2 SUMMARY**

- A. Furnish and install gas fired unit heaters as described in Contract Documents.

#### **1.3 QUALITY ASSURANCE**

- A. Units shall be AGA approved and suitable for natural gas.

#### **1.4 WARRANTY**

- A. Heat exchangers and draft hoods shall be guaranteed by manufacturer for a period of ten years under normal operating conditions.

### **PART 2 - PRODUCTS**

#### **2.1 MANUFACTURED UNITS**

- A. Unit heaters shall have capacities shown on drawings.
- B. Heat exchangers shall be 18 gauge aluminized steel with 16 gauge aluminized steel header plates. Seams shall be electrically welded.
- C. Burners:
  - 1. Stainless steel ribbon inserts
  - 2. Fire directly into the heat exchanger tubes
  - 3. Easily opened access panel in the bottom of each heater for removal of individual burners and pilot assembly.
- D. Unit heaters (unless connected to ductwork) shall have four-way adjustable louvers for proper air diffusion.
- E. Each heater shall be equipped with:
  - 1. 24 volt automatic gas valve
  - 2. Automatic pilot with 100% safety shutoff
  - 3. Snap-acting high limit switch
  - 4. Gas pressure regulator
  - 5. Manual gas cock
- F. Blower models shall be equipped with 115/24 volt transformer and fan control.
- G. Heaters shall be controlled by a Honeywell T87F room thermostat.
- H. Approved Manufacturers:
  - 1. Lennox
  - 2. Reznor

**END OF SECTION 235725**

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## SECTION 26 0501 - COMMON ELECTRICAL REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. General electrical system requirements and procedures.
  - 2. Perform excavating and backfilling work required by work of this Division as described in Contract Documents.
  - 3. Make electrical connections to equipment provided under other Sections.
  - 4. Furnish and install Penetration Firestop Systems at electrical system penetrations as described in Contract Documents.
- B. Related Sections:
  - 1. Division 07: Quality of Penetration Firestop Systems to be used on Project and submittal requirements.

#### 1.2 SUBMITTALS

- A. Product Data:
  - 1. Provide following information for each item of equipment:
    - a) Catalog Sheets.
    - b) Assembly details or dimension drawings.
    - c) Installation instructions.
    - d) Manufacturer's name and catalog number.
    - e) Name of local supplier.
  - 2. Furnish such information for following equipment:
    - a) Section 26 2417: Panelboards
    - b) Section 26 2726: Wiring devices.
    - c) Section 26 2816: Enclosed switches and circuit breakers.
    - d) Section 26 5100: Interior lighting fixtures.
    - e) Section 26 5600: Exterior lighting fixtures
  - 3. Do not purchase equipment before approval of product data.
  - 4. Submit in three-ring binder with hard cover (six sets)
- B. Quality Assurance / Control:
  - 1. Report of site tests, before Substantial Completion.

#### 1.3 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies:
  - 1. NEC and local ordinances and regulations shall govern unless more stringent requirements are specified.
  - 2. Material and equipment provided shall meet standards of NEMA or UL, or ULC, CSA, or EEMAC and bear their label wherever standards have been established and label service is available.
- B. Materials and equipment provided under following Sections shall be by same Manufacturer:
  - 1. Sections 26 2416, 26 2816, and 26 2913: Panelboards, Enclosed Switches And Circuit Breakers, and Enclosed Controllers.
- C. Contractor shall obtain all permits and arrange all inspections required by local codes and ordinances applicable to this Division.

#### 1.4 OWNER'S INSTRUCTIONS

- A. Provide competent instructor for time required to adequately train maintenance personnel in operation and maintenance of electrical equipment and systems. Factory representatives shall assist this instruction as necessary. Schedule instruction period at time of final inspection.

#### 1.5 OPERATION AND MAINTENANCE MANUALS

- A. Prepare and submit (4) four complete copies of the O & M Manuals—manuals to contain information listed below. Place each manual in a tabbed three-ring binder upon completion of the project.
  - 1. Operation and Maintenance manual must contain the following items:
    - a) Copies of reviewed shop drawings.
    - b) Letter of 1-year guarantee of workmanship.
    - c) Copy of voltage and ammeter readings.
    - d) Copy of letter verifying owner's receipt of spare parts.

#### 1.6 GUARANTEE

- A. The following guarantee is a part of this specification and shall be binding on the part of the Contractor:

*"The Contractor guarantees that this installation is free from mechanical defects. He agrees to replace or repair, to the satisfaction of the Owner's Representative, any part of this installation which may fail or be determined unacceptable within a period of one (1) year after final acceptance."*

#### 1.7 RECORD DRAWINGS

- A. During the course of construction, the Electrical Contractor shall maintain a set of drawings upon which all deviations from the original layout are recorded. These marked-up prints shall be turned over to the Architect/Engineer at the conclusion of the work.

### PART 2 - PRODUCTS: Not Used

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. All relocations, reconnections, and removals are not necessarily indicated on Drawings. All such work shall be included without additional cost to Owner.
- B. Confirm dimensions, ratings, and specifications of equipment to be installed and coordinate these with site dimensions and with other Sections.

#### 3.2 INSTALLATION

- A. General:
  - 1. Locations of electrical equipment shown on Drawings are approximate only. Field verify actual locations for proper installation.
  - 2. Coordinate electrical equipment locations and conduit runs with those providing equipment to be served before installation or rough-in.
    - a. Notify Architect of conflicts before beginning work.
    - b. Coordinate locations of power and lighting outlets in mechanical rooms and other areas with mechanical equipment, piping, ductwork, cabinets, etc, so they will be readily accessible and functional.
  - 3. Work related to other trades which is required under this Division, such as cutting and patching, trenching, and backfilling, shall be performed according to standards specified in applicable Sections.



- B. Install Penetration Firestop System appropriate for penetration at electrical system penetrations through walls, ceilings, and top plates of walls.

### 3.3 FIELD QUALITY CONTROL

- A. Site Tests: Test systems and demonstrate equipment as working and operating properly. Notify Architect before test. Rectify defects at no additional cost to Owner.
- B. Measure current for each phase of each motor under actual final load operation, i.e. after air balance is completed for fan units, etc. Record this information along with full-load nameplates current rating and size of thermal overload unit installed for each motor.

END OF SECTION

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## SECTION 26 0503 - EQUIPMENT WIRING SYSTEMS

### PART 1 - GENERAL

#### 1.01 WORK INCLUDED

- A. Electrical connections to equipment specified under other sections or furnished by Owner.

#### 1.02 RELATED WORK

- A. In the even of conflict regarding equipment wiring system requirements between this Section and any other section, the provisions of this Section shall govern.

### PART 2 - PRODUCTS

As described in the related sections.

### PART 3 - EXECUTION

#### 3.01 INSPECTION

- A. Verify that equipment is ready for electrical connection, wiring, and energization.

#### 3.02 PREPARATION

- A. Review equipment submittals prior to installation and electrical rough-in. Verify location, size, and type of connections, voltage, number of phases, and ampacity. Coordinate details of equipment connections with supplier and installer.

#### 3.03 INSTALLATION

- A. Use wire and cable with insulation suitable for temperatures encountered in heat-producing equipment.
- B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit in damp or wet locations and for connections to vibrating equipment. Make flexible connections to vibrating equipment of sufficient length to form a loop to restrict transmission of noise to structural elements or to the air.
- C. Install prefinished cord set or use attachment plug with suitable strain-relief clamps. Refer to Section 26 2726, Wiring Devices, for details.
- D. Make wiring connections in control panel or in wiring compartment of prewired equipment in accordance with manufacturer's instructions. Provide interconnecting wiring where indicated. Tag all interconnecting wiring to identify source and destination equipment and terminal numbers. Refer to Section 26 0553, Electrical Identification, for details.

END OF SECTION

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## SECTION 26 0533 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Includes But Not Limited To:
  - 1. Quality of material and installation procedures for raceway, boxes, and fittings used on Project but furnished under other Divisions.
  - 2. Furnish and install raceway, conduit, and boxes used on Project not specified to be installed under other Divisions.
  - 3. Furnish and install main telephone service raceway as described in Contract Documents and to comply with telephone company requirements.
  - 4. Furnish and install main electrical service raceway to comply with electrical utility company requirements.
- B. Related Sections
  - 1. Section 26 0501: General Electrical Requirements.

### PART 2 - PRODUCTS

#### 2.1 COMPONENTS

- A. Raceway And Conduit:
  - 1. Minimum Sizes:
    - a. 3/4 inch for exterior underground use.
    - b. 3/4 inch minimum Homeruns, 1/2" minimum elsewhere, unless indicated otherwise.
  - 2. Types: Usage of each type is restricted as specified below by product.
    - a. Galvanized rigid steel (RMC) or galvanized intermediate metal conduit (IMC) is allowed for use in all areas. Where in contact with earth or concrete, wrap buried galvanized rigid steel and galvanized IMC conduit and fittings completely with vinyl tape.
    - b. Galvanized Electrical Metallic Tubing (EMT):
      - 1) Allowed for use only in indoor dry locations where it is:
        - a) Not subject to damage.
        - b) Not in contact with earth.
        - c) Not in concrete.
      - 2) Flexible steel conduit or metal-clad cable required for final connections to indoor mechanical equipment.
      - 3) Flexible steel conduit or metal-clad cable required for final connections to indoor mechanical equipment.
    - c. Schedule 40 Polyvinyl Chloride (PVC) Conduit:
      - 1) Allowed for use only underground or below concrete with galvanized rigid steel or IMC elbows and risers.
    - d. Listed, Liquid-Tight Flexible Metal Conduit:
      - 1) Use in outdoor final connections to mechanical equipment, length not to exceed 36 inches.
  - 3. Prohibited Raceway Materials:
    - a. Aluminum conduit.
    - b. Armored cable type AC (BX) cable.
- B. Raceway And Conduit Fittings:
  - 1. Rigid Steel Conduit And IMC: Threaded and designed for conduit use.
  - 2. EMT:
    - a. Compression type where exposed.
    - b. Steel set screw housing type, interior dry, concealed locations.
  - 3. PVC Conduit:

- a. PVC type. Use PVC adapters at all boxes.
  - b. PVC components, (conduit, fittings, cement) shall be from same Manufacturer.
- 4. Flexible Steel Conduit: Screw-in type.
- 5. Liquid-tight Flexible Metal Conduit: Sealite type.
- 6. Expansion fittings shall be equal to OZ Type AX sized to raceway and including bonding jumper.
- 7. Prohibited Fitting Materials:
  - a. Crimp-on, tap-on, indenter type fittings.
  - b. Cast set-screw fittings for EMT.
  - c. Spray (aerosol) PVC cement.
- C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
  - 1. Provide metal supports and other accessories for installation of each box.
  - 2. Equip ceiling and bracket fixture boxes with fixture studs where required.
  - 3. Equip outlets in plastered, paneled, and furred finishes with plaster rings and extensions to bring box flush with finish surface.
  - 4. Telephone / data outlet boxes shall be 4sq. deep boxes with single-gang mudring where two or more cables come to one box.

## 2.2 MANUFACTURERS

- A. Contact Information:
  - 1. Cooper B-Line, Highland, IL [www.bline.com](http://www.bline.com).
  - 2. Hubbell Incorporated, Milford, CT [www.hubbell-wiring.com](http://www.hubbell-wiring.com).
  - 3. Square D, Palatine, IL [www.squared.com](http://www.squared.com).
  - 4. Steel City, Div Thomas & Betts, Memphis, TN [www.tnb.com](http://www.tnb.com).
  - 5. Thomas & Betts, Memphis, TN [www.tnb.com](http://www.tnb.com).
  - 6. Walker Systems Inc, Williamstown, [www.wiremold.com](http://www.wiremold.com).
  - 7. Wiremold Co, West Hartford, CT [www.wiremold.com](http://www.wiremold.com).

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Confirm dimensions, ratings, and specifications of materials to be installed and coordinate these with site dimensions and with other Sections.

### 3.2 INSTALLATION

- A. Interface With Other Work:
  - 1. Coordinate with Divisions 22 and 23 for installation of raceway for control of plumbing and HVAC equipment.
  - 2. Before rough-in, verify locations of boxes with work of other trades to insure that they are properly located for purpose intended.
    - a. Coordinate location of outlet for water cooler with Division 22.
    - b. Coordinate location of outlets adjacent to or in millwork with Division 06 before rough-in. Refer conflicts to Architect and locate outlet under his direction.
  - 3. Coordinate installation of floor boxes in carpeted areas with carpet installer to obtain carpet for box doors.
  - 4. Install pull wires in raceways installed under this Section where conductors or cables are to be installed under other Divisions.
- B. Conduit And Raceway:
  - 1. Conceal raceways within ceilings, walls, and floors, except at Contractor's option, conduit may be exposed on walls or ceilings of mechanical equipment areas and above acoustical panel suspension ceiling systems. Install exposed raceway runs parallel to or at right angles to building structure lines.
  - 2. Keep raceway runs 6 inches minimum from hot water pipes.
  - 3. Make no more than four quarter bends, 360 degrees total, in any conduit run between outlet and outlet, fitting and fitting, or outlet and fitting.

- a. Make bends and offsets so conduit is not injured and internal diameter of conduit is not effectively reduced.
  - b. Radius of curve shall be at least minimum indicated by NEC.
4. Cut conduit smooth and square with run and ream to remove rough edges. Cap raceway ends during construction. Clean or replace raceway in which water or foreign matter have accumulated.
5. Install insulated bushings on each end of raceway 1-1/4 inches in diameter and larger, and on all raceways where low voltage cables emerge. Install expansion fittings where raceways cross building expansion joints.
6. Run two spare conduits from each new panelboard to ceiling access area or other acceptable accessible area and cap for future use.
7. Route conduit through roof openings for piping and ductwork where possible; otherwise. All roof penetrations shall be flashed, counter flashed and sealed per Roofing Contractor. Coordinate all roof penetrations with the Roofing Contractor.
8. Provide nylon pull string with printed footage indicators secured at each end of each empty conduit, except sleeves and nipples. Identify with tags at each end the origin and destination of each empty conduit, and indicate same on all empty or spare conduits on the as-built drawings.
9. Install expansion-deflection joints where conduit crosses building expansion, seismic, or structural isolation break (SIB) joints.
10. Where conduit penetrates fire-rated walls and floors, seal opening around conduit with UL-listed foamed silicone elastomer compound. Fill void around perimeter of conduits with nonmetallic nonshrink grout in all concrete or masonry walls.
11. Bend PVC conduit by hot box bender and, for PVC 2 inches in diameter and larger, expanding plugs. Apply PVC adhesive only by brush.
12. Installation In Framing:
  - a. Do not bore holes in joists or beams outside center 1/3 of member depth or within 24 inches of bearing points. Do not bore holes in vertical framing members outside center 1/3 of member width.
  - b. Holes shall be one inch diameter maximum.
13. Underground Raceway And Conduit:
  - a. Bury underground raceway installed outside building 24 inches deep minimum.
  - b. Bury underground conduit in planting areas 18 inches deep minimum. It is permissible to install conduit directly below concrete sidewalks, however, conduit must be buried 18 inches deep at point of exit from planting areas.
14. Conduit And Raceway Support:
  - a. Securely support raceway with approved straps, clamps, or hangers, spaced as required.
  - b. Do not support from mechanical ducts or duct supports without Architect's written approval. Securely mount raceway supports, boxes, and cabinets in an approved manner by:
    - 1) Expansion shields in concrete or solid masonry.
    - 2) Toggle bolts on hollow masonry units.
    - 3) Wood screws on wood.
    - 4) Metal screws on metal.
15. Prohibited Procedures:
  - a. Use of wooden plugs inserted in concrete or masonry units for mounting raceway, supports, boxes, cabinets, or other equipment.
  - b. Installation of raceway that has been crushed or deformed.
  - c. Use of torches for bending PVC.
  - d. Spray applied PVC cement.
  - e. Boring holes in truss members.
  - f. Notching of structural members.
  - g. Supporting raceway from ceiling system support wires.

C. Boxes:

1. Boxes shall be accessible and installed with approved cover.
2. Do not locate device boxes that are on opposite sides of framed walls in the same stud space. In other wall construction, do not install boxes back to back.
3. Locate boxes so pipes, ducts, or other items do not obstruct outlets.
4. Install outlets flush with finished surface and level and plumb.
5. Support switch boxes larger than two-gang with side brackets and steel bar hangers in framed walls.
6. At time of substantial completion, install blank plates on uncovered outlet boxes that are for future use.
7. Install air / vapor barrier back boxes behind outlet boxes that penetrate vapor barrier.
8. Location:
  - a. Install boxes at door locations on latch side of door, unless explicitly shown otherwise on Drawings. Verify door swings shown on electrical drawings with architectural drawings, and report discrepancies

to Architect before rough-in. Distance of switch boxes from jamb shall be within 6 inches of door jamb.

- b. Arrange boxes for ceiling light fixtures symmetrically with respect to room dimensions and structural features.
- c. Properly center boxes located in walls with respect to doors, panels, furring, trim and consistent with architectural details. Where two or more outlets occur, space them uniformly and in straight lines with each other, if possible.
- d. Center ceramic tile boxes in tile.

END OF SECTION



## SECTION 26 0553-ELECTRICAL IDENTIFICATION

### PART 1 - GENERAL

#### 1.01 WORK INCLUDED

- A. Nameplates and labels.
- B. Wire and cable markers.

#### 1.02 RELATED WORK

- A. This Section shall be used in conjunction with the following other specifications and related Contract Documents to establish the total requirements for electrical identification.
  - 1. Section 26 0501 - Basic Electrical Requirements
- B. In the event of conflict regarding electrical identification requirements between this Section and any other section, the provisions of this Section shall govern.

### PART 2 - PRODUCTS

#### 2.01 MATERIALS

- A. Nameplates: Engraved three-layer laminated plastic, minimum 3/16 inch high white letters on a black background.
- B. Nameplates (Emergency Equipment): Engraved three-layer laminated plastic, minimum 3/16 inch high white letters on a red background.
- C. Wire and Cable Markers: Split sleeve or tubing type. Cloth or wraparound adhesive types not approved.
- D. Conductor-color Tape: Colored vinyl electrical tape.

### PART 3 - EXECUTION

#### 3.01 INSTALLATION

- A. Degrease and clean surfaces to receive nameplates.
- B. Install nameplates and labels parallel to equipment lines.
- C. Secure nameplates to equipment fronts. Secure nameplate to outside face of panelboard doors.
- D. Embossed tape will not be permitted for any application.
- E. Electrical Contractor shall write the circuit number to which each device is connected on the inside of the box (clearly visible when device is removed) and on the backside of each coverplate. Use a permanent black marker.

### 3.02 WIRE IDENTIFICATION

- A. Conductors for power circuits to be identified per the following schedule.

Conductor	System Voltage	
	480Y/277V	208Y/120V
Phase A	Brown	Black
Phase B	Orange	Red
Phase C	Yellow	Blue
Neutral	Grey	White
Grounding	Green	Green
Isolated Ground	Green with yellow stripe	Green with yellow stripe
Switchleg (lighting)	Purple	Pink

### 3.03 NAME PLATE ENGRAVING SCHEDULE

- A. Provide nameplates of minimum letter height as scheduled below.

- B. Panelboards, Switchboards and Motor Control Centers:
- 1st Line - Equipment Name: 1/4 inch Lettering.
  - 2nd Line - Voltage Rating: 3/16 inch Lettering
  - 3rd Line - Feed Source: 3/16 inch Lettering
  - Nameplate Examples:

**PANEL: HA**  
**480Y/277V**  
**FEED FROM:**  
**MSB-2**

**SWBD: MSB**  
**480Y/277V**  
**FEED FROM:**  
**UTIL.**

**MCC-A: SEC. 1**  
**480V-3P**  
**FEED FROM:**  
**MSB-2**

- C. Individual Circuit Breakers, Switches, and Motor Starters in Switchboards, and Motor Control Centers:
- 1st Line - Load Served: 1/4 inch Lettering.
  - 2nd Line - Location of Load: 3/16 inch Lettering
  - Nameplate Examples:

**PUMP: P-1**  
**MECH. RM 112**

- D. Individual Circuit Breakers, Enclosed Switches, and Motor Starters:
- 1st Line - Load Served: 1/4 inch Lettering.
  - 2nd Line - Voltage Rating: 3/16 inch Lettering
  - 3rd Line - Feed Source: 3/16 inch Lettering
  - Nameplate Examples:

**FAN: F-1**  
**480V-3P**  
**FEED FROM: HM-**  
**1,3,5**

- E. Transformers: 3/16 inch; identify equipment designation. 1/8 inch; identify primary and secondary voltages, primary source, and secondary load and location.
1. 1st Line - Equipment Name: 3/16 inch Lettering.
  2. 2nd Line - Voltage Rating: 1/8 inch Lettering
  3. 3rd Line - Feed Source: 1/8 inch Lettering
  4. Nameplate Example:

<p><b>XFMR:TA</b> <b>480-208Y/120V</b> <b>FEED FROM: HA-2</b> <b>SUPPLIES: PNL</b> <b>LA</b></p>
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END OF SECTION

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## SECTION 26 2417 - PANELBOARDS

### PART 1 - GENERAL

#### 1.01 WORK INCLUDED

- A. Distribution panelboards.
- B. Lighting and appliance branch circuit panelboards.

#### 1.02 RELATED WORK

- A. This Section shall be used in conjunction with the following other specifications and related Contract Documents to establish the total requirements for panelboards.
  - 1. Section 26 0501 - Basic Electrical Requirements.
  - 2. Section 26 0553 - Electrical Identification.
- B. In the event of conflict regarding panelboard requirements between this Section and any other section, the provisions of this Section shall govern.

#### 1.03 SUBMITTALS

- A. Provide the following in addition to the standard requirements: Include outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.

#### 1.04 SPARE PARTS

- A. Keys: Furnish two each to Owner.

### PART 2 - PRODUCTS

#### 2.01 ACCEPTABLE MANUFACTURERS

- A. Square D: I-Line, NQ and NF Series
- B. General Electric (GE): Spectra & A Series.
- C. Cutler-Hammer (Eaton): Pow-R-Line Series

#### 2.02 DISTRIBUTION PANELBOARDS

- A. Panelboards: NEMA PB 1; circuit breaker type: FS W-P-115; Type I, Class I.
- B. Enclosure: NEMA PB 1; Type and Mounting as indicated on panel schedule.
- C. Provide cabinet front with concealed trim clamps and hinged door with flush lock. Finish in manufacturer's standard gray enamel.
- D. Provide Dist. panelboards with following:
  - 1. Bussing: Aluminum
  - 2. Rating: as indicated in panel Schedule
  - 3. Ground & Neutral Bus in all panelboards.
  - 4. Integral Surge Protection Device
- E. Minimum Integrated Short Circuit Rating: 22,000 amperes rms symmetrical for 240 volt Dist. panelboards; 42,000 amperes rms symmetrical for 480 volt Dist. panelboards, or as indicated in panel schedule.

- F. Molded Case Circuit Breakers: NEMA AB 1; provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole. Provide circuit breakers UL listed as type HACR for air conditioning equipment branch circuits.
- G. Nameplates: Engraved three-layer laminated plastic, minimum 3/16 inch high white letters on a black background. Label to include panel identification, voltage and source. Label to be attached with screws.

## 2.03 LIGHTING & BRANCH CIRCUIT PANELBOARDS

- A. Lighting and Appliance Branch Circuit Panelboards: NEMA PB 1; circuit breaker type.
- B. Enclosure: NEMA PB 1; Type and Mounting as indicated on panel schedule.
- C. Cabinet Size: 5-3/4 inches deep; 20 inches wide for 240 volt and less panelboards, 20 inches for 480 bolt panelboards.
- D. Provide flush surface cabinet front with typewritten directory, concealed trim clamps, concealed hinge and flush lock all keyed alike. Finish in manufacturer's standard gray enamel.
- E. Provide panelboards with the following:
  - 1. Bussing: Aluminum
  - 2. Rating: as indicated in panel Schedule
  - 3. Ground and Neutral Bus in all panelboards.
  - 4. Integral Surge Protection Device
- F. Minimum Integrated Short Circuit Rating: 10,000 amperes rms symmetrical for 240 volt panelboards; 14,000 amperes rms symmetrical for 480 volt panelboards, or as indicated in panel schedule.
- G. Molded Case Circuit Breakers: NEMA AB 1, FS W-C-375; bolt on type thermal magnetic trip circuit breakers, with common trip handle for all poles. Provide circuit breakers UL listed as Type SWD for lighting circuits. Provide UL Class A ground fault interrupter circuit breakers where scheduled on Drawings. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits.
- H. Nameplates: Engraved three-layer laminated plastic, minimum 3/16 inch high white letters on a black background. Label to include panel identification and voltage. Label to be attached with screws.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. Install panelboards plumb in conformance with NEMA PB 1.1.
- B. Height: 78 inches to top.
- C. Adjust trim to cover all openings.
- D. Provide filler plates for unused spaces in panelboards.
- E. Provide typed circuit directory for each branch circuit panelboard and Distribution panelboard. Revise directory to reflect circuiting changes required to balance phase loads.

### 3.02 FIELD QUALITY CONTROL

- A. Measure steady state load currents at each panelboard feeder. Should the difference at any panelboard between phases exceed 20 percent, rearrange circuits in the panelboard to balance the phase loads within 20 percent. Take care to maintain proper phasing for multiwire branch circuits.

- B. Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections for circuit breakers, fusible switches, and fuses.

END OF SECTION

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## SECTION 26 2726 - WIRING DEVICES

### PART 1 - GENERAL

#### 1.01 WORK INCLUDED

- A. Wall switches.
- B. Receptacles.
- C. Device plates and box covers.
- D. Cords and caps.

#### 1.02 RELATED WORK

- A. This Section shall be used in conjunction with the following other specifications and related Contract Documents to establish the total requirements for wiring devices.
  - 1. Section 26 0501 - Basic Electrical Requirements.
- B. In the event of conflict regarding requirements for wiring devices between this Section and any other section, the provisions of this Section shall govern.

#### 1.03 DESIGN REQUIREMENTS

- A. FS W-C-596 - Electrical Power Connector, Plug, Receptacle, and Cable Outlet.
- B. FS W-S-896 - Switch, Toggle.
- C. NEMA WD 1 - General Requirements for Wiring Devices.
- D. NEMA WD 6 - Wiring Devices - Dimensional Requirements.

### PART 2 - PRODUCTS

#### 2.01 WALL SWITCHES

- A. Acceptable Manufacturers:

MFG.	1-Pole	3-Way	4-Way	Pilot Light
Hubbell	1221-*	1223-*	1234-*	1221-P1 *
P & S	PS20AC1-*	PS20AC3-*	PS20AC4-*	
Leviton	1221-*	1223-*	1224-*	
Cooper	AH1221-*	AH1223-*	AH1224-*	AH1221LT

- B. Wall Switches for Lighting Circuits shall meet Federal Spec WS-896.
  - 1. AC general use snap switch with toggle rocker handle, Screw type terminals only.
  - 2. 20 Amperes and 120-277 Volts AC rated .
  - 3. \*Color: As selected by Owner/Architect, Red if connected to an Emergency Circuit. (Standard colors shall include brown, gray, ivory, black or a white for all devices.)
- C. Pilot Light Type: Red pilot handle; handle lighted when switch is ON.
- D. Provide 3-way and 4-way switches of matching style, appearance and specification as indicated on drawings.

#### 2.02 RECEPTACLES

- A. Acceptable Manufacturers:

<b>STANDARD</b>
-----------------

<b>MFG</b>	<b>Duplex</b>	<b>GFI</b>	<b>USB</b>	<b>Tamper</b>
Hubbell	HBL5352*	GF20*L	USB20X2*	BR20*TR
P & S	5362*	2095-*		TR5362*
Leviton	5362*			
Cooper	5352*	VGF20*-AG	TR7746*	TR5362*

<b>HOSPITAL GRADE</b>				
<b>MFG</b>	<b>Duplex</b>	<b>GFI</b>	<b>USB</b>	<b>Tamper</b>
Hubbell	HBL8300H*	GFR8300H*L	USB8300*	
P & S	8300H*	2095HG*		TR63H*
Leviton	8300-H*			
Cooper	8300*	VGFH20*	TR8345*	TR8300*

- B. Convenience and Straight-blade Receptacles: NEMA WD 1, Heavy Duty Specification Grade.
- C. Locking-Blade Receptacles: NEMA WD 5.
- D. Convenience Receptacle Configuration: NEMA WD 1; Type 5-20R.
  - 1. \*Color: As selected by Owner/Architect. Receptacles on Emergency circuit shall be Red in color. (Standard colors shall include brown, gray, ivory, black and white for all devices.)
- E. Weatherproof Receptacles: GFI, UL weather-resistant listed Receptacle mounted in a cast steel box with gasketed, weatherproof device plate and In-Use Cover.
- F. Specific-use Receptacle Configuration: NEMA WD 1 or WD 5; type as indicated on Drawings, brown nylon face.
- G. GFCI Receptacles: Duplex convenience receptacle with integral ground fault current interrupter. NEMA Type 5-20R.
  - 1. \*Color: As selected by Owner/Architect. Receptacles on Emergency circuit shall be Red in color. (Standard colors shall include brown, gray, ivory, black and white for all devices.)
  - 2. Feed-through type for downstream device protection.
  - 3. All receptacles indicated to be installed in a toilet room, bathroom, roof top, and outdoors or within 6 feet of a sink, basin, tub or floor sink shall be GFCI protected

#### 2.03 SPECIFIC PURPOSE RECEPTACLES

- A. NEMA WD 1 or WD 5; type as indicated on Drawings.
- B. Isolated Ground Type: Straight blade type 5-20R as indicated on the Drawings. Grey nylon face.
- C. Twist lock type. NEMA configuration as shown on the Drawings.

#### 2.04 WALL PLATES

- A. Color shall match device: As selected by Owner/Architect. Receptacles on Emergency circuit shall be Red in color. (Standard colors shall include brown, gray, ivory, black and white for all devices.)
- B. Material:
  - 1. Finished Spaces: Stainless Steel
  - 2. Unfinished Spaces: Galvanized Steel
- C. All isolated ground receptacle covers shall bear the engraved phrase "ISOLATED GROUND".
- D. Engraved Plates: Same plate as specified herein. Provide with engraved characters 1/8 inch high characters (all letters in upper case) with filler of black color.

- E. Weatherproof Cover Plate: Gasketed cast metal with hinged gasketed device covers.

## 2.05 CORDS AND CAPS

- A. Acceptable Manufacturers:
  - 1. Hubbell.
  - 2. Leviton.
  - 3. Pass and Seymour.
  - 4. Cooper
- B. Straight-blade Attachment Plug: NEMA WD 1.
- C. Locking-blade Attachment Plug: NEMA WD 5.
- D. Attachment Plug Configuration: Match receptacle configuration at outlet provided for equipment.
- E. Cord Construction: Oil-resistant thermoset insulated Type SO multiconductor flexible cord with identified equipment grounding conductor, suitable for hard usage in damp locations.
- F. Cord Size: Suitable for connected load of equipment and rating of branch circuit overcurrent protection.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. Install wall switches 48 inches AFF, OFF position down.
- B. Install convenience receptacles 18 inches AFF, 4 inches above backsplash, or as noted, in a vertical position with grounding pole down.
- C. Install specific-use receptacles at heights shown on Contract Drawings.
- D. Install convenience receptacles in 4 square box in a vertical position with the ground pole down.

END OF SECTION

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## SECTION 26 5100 - INTERIOR LIGHTING

### PART 1 GENERAL

#### 1.1 SUMMARY

##### A. SECTION INCLUDES

1. Interior luminaires and accessories
2. Lamps
3. Ballasts

##### B. DEFINITIONS:

1. Luminaire: A luminaire is a complete lighting unit including light source(s) and parts required to distribute the light, position and protect the light source(s), and connect the light source(s) to the power supply.
2. Average Life: The time after which 50 percent will have failed and 50 percent will have survived under specified operating and starting condition.
3. Total harmonic distortion (THD): The root mean square (RMS) of all the harmonic components divided by the fundamental current.

#### 1.2 SUBMITTALS

##### A. Submit the following in accordance with project submittal procedures:

1. Catalog Data: Submit catalog data describing luminaires, lamps, and ballasts. Include data substantiating that materials comply with specified requirements. Arrange data for luminaires in the order of fixture designation.
2. Performance Curves/Data:
  - a. Submit certified photometric data for each type of luminaire.
  - b. Submit supply-air, return-air, heat-removal, and sound performance data for air handling luminaires.
3. Drawings: Submit shop drawings for non-standard luminaires.

#### 1.3 QUALITY ASSURANCE

- A. Comply with the *National Electrical Code* (NEC) and the *International Building Code* (IBC) for components and installation.
- B. Provide luminaires listed and labeled by a nationally recognized testing laboratory (NRTL) for the application, installation condition, and the environments in which installed.
- C. Use manufacturers that are experienced in manufacturing luminaires, lamps and ballasts similar to those indicated for this Project and have a record of successful in-service performance.
- D. Coordinate luminaires, mounting hardware and trim with the ceiling system.

#### 1.4 WARRANTY

- A. Electronic Ballasts: Submit a warranty, mutually executed by the ballast manufacturer and the installer, agreeing to replace electronic ballasts that fail in materials or workmanship within five years, beginning on the date of substantial completion of project.

- B. LED Luminaires: Submit a warranty, mutually executed by the LED luminaire manufacturer and the installer, agreeing to replace LED luminaires that fail in materials or workmanship within five years, beginning on the date of substantial completion of project.

## 1.5 RECEIVING, STORING AND PROTECTING

- A. Receive, store, and protect, and handle products according to the following NECA National Electrical Installation Standards:
  - 1. NECA/IESNA 500, *Recommended Practice for Installing Indoor Commercial Lighting Systems* (ANSI)
  - 2. NECA/IESNA 502, *Recommended Practice for Installing Industrial Lighting Systems* (ANSI)

## PART 2 PRODUCTS

### 2.1 INTERIOR LUMINAIRES

- A. Furnish interior luminaires that comply with requirements specified below, indicated on the Drawings, and as required to meet conditions of installation.
- B. Metal parts shall be free from burrs and sharp corners and edges.
- C. Metal components shall be formed and supported to prevent sagging and warping.
- D. Steel parts shall be finished with manufacturer's standard finish applied over a corrosion-resistant primer. Finish shall be free from runs, streaks, stains, holidays or defects.
- E. Doors and frames shall be smooth operating and free from light leakage under operating conditions. Relamping shall be possible without the use of tools. Doors, frames, lenses and diffusers shall be designed to prevent accidental falling during relamping and when secured in the operating position.
- F. Pulse-start metal-halide luminaires shall be sufficiently enclosed to prevent escape of lamp parts in the event of catastrophic lamp failure.
- G. Lenses, diffusers, covers and globes shall be 100 percent virgin acrylic unless specified otherwise on the Drawings. Lenses shall have 0.125 inches minimum thickness. Lenses for fluorescent troffers shall be injection molded.
- H. Luminaires shall conform to UL 1598 - *Luminaires*. Provide product with damp location listing or wet location listing as required by installation location.
- I. Light diffusers, other than those made of metal or glass, used in air-handling light fixtures shall be listed and marked "Fixture Light Diffusers for Air-Handling Fixtures."

### 2.2 LED LUMINAIRES

- A. For LED lighting in interior spaces, use NRTL-listed 120V or 277V luminaires with the performance characteristics listed below:
  - 1. Minimum luminaire efficacy per IES LM-79-08, *Approved Method: Electrical and Photometric Measurement of Solid-State Lighting Products*:
    - a. 90 lumens/watt for general lighting,
    - b. 50 lumens/watt for accent and display lighting, down-lighting, and special purpose lighting.
  - 2. Correlated color temperature (CCT) per IES LM-79-08 and ANSI/NEMA/ANSI C78.377-2008, *Specification for the Chromaticity of Solid-State Lighting (SSL) Products*:
    - a. [3500 °K] for general lighting and down-lighting,
    - b. [3500 °K] for accent and display lighting, and special purpose lighting.

3. Color rendering index (CRI): 90 or better per IES LM-79-08.
4. LED Design life (L70): Not less than 50,000 hours per IES LM-80-08, *Approved Method: Measuring Lumen Maintenance of LED Light Sources*.
5. Driver System Design Life: Not less than the LED design life; note that the driver system includes all associated components, not just the driver integrated circuit. Driver system design life is defined as when 2 percent of the systems would have failed.
6. Power factor: 0.90 or better.
7. Design ambient temperature: 35 °C (95 °F); note that this is the ambient temperature surrounding the luminaire, not the LED or driver heat-sink temperature.
8. EMI/RFI: Meet FCC 47 CFR Part 15.
9. Minimum dimming provisions or capability:
  - a. 50% step for general lighting,
  - b. Down to 20% for accent and display lighting, and special purpose lighting.

## 2.3 LAMPS

- A. Furnish lamps that comply with requirements specified below and the luminaire schedule on the Drawings.
- B. Conform to the NEMA C78 standard applicable to each type of lamp.
- C. For fluorescent general lighting in interior spaces use T8, T5, or T5HO lamps as indicated on the Drawings with the following characteristics:

Characteristic	T8 Lamps	T5 Lamps	T5HO Lamps
Nominal length:	48 inches	46 inches	46 inches
Actual length (base face to base face):	47.2 inches	45.2 inches	45.2 inches
Base type:	Medium bi-pin	Miniature bi-pin	Miniature bi-pin
Initial Light Output (after 100 hours of operation):	2700 - 2850 lumens	2900 - 3050 lumens	5000 lumens
Mean Light Output (at 40 percent of rated life):	2440 - 2710 lumens	2660 - 2900 lumens	4600 - 4740 lumens
Nominal Lamp Efficacy:	87 lumens per watt at 77 °F	103 lumens per watt at 95 °F	93 lumens per watt at 95 °F
Color temperature:	3500 °K	3500 °K	4100 °K
Minimum Average Life (based on 3-hour switching cycle):	20,000 hours	20,000 hours	30,000 hours

Color rendering index (CRI)	75	85	85
Minimum Starting Temperature:	50 °F	-4 °F	-4 °F
EPA TCLP Compliant:	Yes	Yes	Yes
Ballast Type:	Electronic programmed start	Electronic programmed start with end-of-life shutdown.	Electronic programmed start with end-of-life shutdown.

- D. For pulse-start metal-halide general lighting in interior spaces use lamps with 3700 to 4000 K color temperatures and color rendering index (CRI) of at least 65.
- E. All linear fluorescent lamps, fluorescent compact lamps, and high pressure sodium lamps shall pass the EPA Toxic Characteristic Leachate Procedure (TCLP) test for mercury by using the lamp sample preparation procedure described in NEMA LL 1, *Procedure for Linear Fluorescent LAML Sample Preparation and TCLP Extraction*.
- F. Manufacturers: GE Lighting, North American Phillips, Sylvania

## 2.4 FLUORESCENT LAMP BALLASTS

- A. For fluorescent luminaires provide NRTL-listed electronic fluorescent ballasts that have the following characteristics:
  1. Conform to UL 935 - *Fluorescent Lamp Ballasts* and NEMA C82.11 – *High Frequency Electronic Lamp Ballasts* (ANSI)
  2. Ballast protection: Class P
  3. Starting method: programmed rapid-start
  4. Power factor: at least 95 percent
  5. Ballast factor: at least 0.87
  6. Crest factor: 1.7 or less
  7. Line current total harmonic distortion (THD): less than 15 percent
  8. Minimum operating frequency: 40 kHz
  9. Sound rating: Class A
  10. Minimum starting temperature: 0 degrees F with T5 and T8 lamps
  11. Transient voltage protection: ANSI C62.41 location A2
  12. EMI/RFI compliance: FCC 47 CFR Part 18, Non-Consumer
  13. Ballasts for T5 and T5HO lamps shall have circuitry to shut down the system when lamps reach end-of-life.
- B. Manufacturers: Advance, GE Lighting, Universal, Sylvania
- C. Three and four lamp luminaires shall have two ballasts per luminaire for multilevel switching.
- D. Provide NRTL-listed luminaire disconnect assembly for each ballast. Manufacturer: IDEAL “PowerPlug”, Thomas & Betts “Sta-Con.”



## 2.5 HIGH INTENSITY DISCHARGE LAMP BALLASTS

- A. Pulse-start metal-halide ballasts shall comply with requirements specified below for lamps specified in this Section and the luminaire schedule on the Drawings:
  - 1. Conform to UL 1029 - *High-Intensity-Discharge Lamp Ballasts* and NEMA C82.4 - *Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps*.
  - 2. Constant wattage auto-transformer (CWA) or regulator, high-power-factor type, minimum 90 percent.
  - 3. Ballasts shall incorporate a solid-state igniter/starter with an average life in the pulsing mode of 4,000 hours at a case temperature of 90 C.
- B. Manufacturers: Advance, GE Lighting, Universal

## 2.6 LUMINAIRE ACCESSORIES

- A. Provide stud supports, mounting brackets, frames, plaster rings and other accessories required for luminaire installation.
- B. Furnish hangers as specified below and as required by conditions of installation:
  - 1. Stem hangers shall be made of 1/2-inch steel tubing with 45 degrees swivel ball hanger fitting and ceiling canopy. Finish the same as the luminaire.
  - 2. Rod hangers shall be made of 1/4 inch threaded zinc-plated steel rod.
  - 3. For HID luminaires provide hook hangers that are integrated assemblies matched to the luminaire and line voltage; equip with threaded attachment, power cord and locking type plug. Provide a safety chain or cable for each luminaire that will attach to the building structure, the ballast housing, and to the reflector/diffuser assembly.
- C. Use NRTL-listed T-bar safety clips for lay-in fluorescent luminaires.
- D. Where indicated on the Drawings or where lamp breakage is detrimental, such as above food counters, provide open fluorescent luminaires with:
  - 1. Self-locking sockets or lamp retainers, two per lamp, and
  - 2. Clear polycarbonate protective lamp sleeves with end caps over each lamp. Sleeve shall have a light transmission of 95 percent and shall be rated for the thermal profile of the lamp and ballast.

## PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Install interior lighting system in accordance with the NEC, manufacturer's installation instructions, approved shop drawings, and the following NECA National Electrical Installation Standards:
  - 1. NECA/IESNA 500, *Recommended Practice for Installing Indoor Commercial Lighting Systems* (ANSI)
  - 2. NECA/IESNA 502, *Recommended Practice for Installing Industrial Lighting Systems* (ANSI).
- B. Have the manufacturer's installation instructions available at the Project site.
- C. Mounting heights specified or indicated on the Drawings are to the bottom of the luminaire for ceiling-mounted fixtures and to the center of the luminaire for wall-mounted fixtures.
- D. Where the ceiling forms the protective membrane of a fire resistive assembly, install protective coverings over luminaires in accordance with NRTL requirements.
- E. Install slack safety wires as described below for luminaires in or on suspended ceilings.
  - 1. Wire shall be minimum 12 gage galvanized soft annealed steel wire conforming to ASTM A641.
  - 2. Attach wire to the building structure directly above the attachment point on the box or luminaire; make trapezes of framing channel material as required to span obstacles

3. Secure wire(s) at each end with not less than three tight turns in 1-1/2 inches.
- F. Install fluorescent emergency luminaires in suspended ceilings as follows:
1. Fasten the four corners of each luminaire to the suspended ceiling main channels or framing members.
    - a. Use sheet metal screws or bolts to fasten luminaires above exit pathways.
    - b. Use NRTL listed clips, sheet metal screws, or bolts to fasten luminaires that are not above exit pathways.
  2. Install two independent slack safety wires per luminaire with dimensions not exceeding 2 ft x 4 ft. Install four independent slack safety wires per luminaire with dimensions exceeding 2 ft x 4 ft. Attach wires to the luminaire not more than 6 inches from the luminaire corners.
- G. Support pendant-mounted or cable-supported luminaires directly from the structure above using a 9 gage wire or an approved alternate support without using the ceiling suspension system for direct support.
1. Install seismic restraints for pendant-mounted and cable-supported luminaires.
  2. Pendants, rods, cables, or chains 4 ft or longer shall be braced to prevent swaying using three cables at 120 degrees separation.
- H. Connect luminaires in suspended ceilings using 6 ft. lengths of flexible wiring method arranged to accommodate not less than 4 inches of differential seismic movement in any direction. Refer to Section 26 0533 - Raceways and Boxes for Electrical Systems.

### 3.2 LUMINAIRE MAINTENANCE MARKING

- A. Each luminaire shall be clearly and permanently marked with a field-applied pressure-sensitive label indicating specific replacement lamps and ballasts. The following information shall be noted in the format "Use Only \_\_\_\_\_":
1. Lamp diameter code (T5, T5HO, T8), tube configuration (twin tube, quad, triple), base type, and nominal wattage for fluorescent and compact fluorescent luminaires.
  2. Lamp type, wattage, bulb type (ED17, B56, etc.) and coating (clear or coated) for HID luminaires.
  3. Start type (preheat, rapid start, programmed start) for fluorescent and compact fluorescent luminaires.
  4. ANSI ballast type (M98, M57, etc.) for HID luminaires.
  5. Correlated color temperature (CCT) and color rendering index (CRI) for all lamps].
- B. Markings shall be located to be readily visible to service personnel, but unseen from normal viewing angles when lamps are in place.
- C. Pressure-sensitive labels shall be in accordance with UL 969 – *Marking and labeling Systems*.

### 3.3 FIELD QUALITY CONTROL

- A. Make electrical connections, clean interiors and exteriors of luminaires, install lamps, energize and test luminaires, inspect interior lighting system, and deliver spare parts in accordance with manufacturer's instructions and the following NECA National Electrical Installation Standards:
1. NECA/IESNA 500, *Recommended Practice for Installing Indoor Commercial Lighting Systems* (ANSI)
  2. NECA/IESNA 502, *Recommended Practice for Installing Industrial Lighting Systems* (ANSI)
- B. Test electronic dimming ballasts for full range dimming capability.
1. Burn-in dimmer controlled fluorescent lamps at full output for not less than 100 hours before dimming.
  2. Check for visually detectable flicker over the full dimming range.

END OF SECTION

## SECTION 26 5200 - EMERGENCY LIGHTING

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Fluorescent emergency ballasts.
- B. LED exit signs.

#### 1.2 SUBMITTALS

- A. Submit the following in accordance with project submittal procedures:
  - 1. Catalog Data: Submit catalog data describing emergency lighting. Include data substantiating that materials comply with specified requirements. Arrange data for luminaires in the order of fixture designation.
  - 2. Maintenance Instructions: Submit maintenance instructions for inclusion in the operating and maintenance manuals.

#### 1.3 SPARE MATERIALS

- A. Furnish the following extra materials matching products installed. Package the extra materials with protective covering for storage and identify with labels describing contents.
- B. Lamps: Provide 10 percent of quantity of lamps of each type, but no fewer than two lamps of each type.

#### 1.4 QUALITY ASSURANCE

- A. Comply with ANSI/NFPA 70 - *National Electrical Code* (NEC), NFPA 101 - *Life Safety Code*, and the *International Building Code* (IBC) for components and installation.
- B. Emergency lighting units and exit signs shall be NRTL-listed and labeled for their indicated use and location on this project by a Nationally Recognized Testing Laboratory (NRTL) in accordance with UL 924 – *Emergency Lighting and Power Equipment*.
- C. Use manufacturers that are experienced in manufacturing emergency lighting units similar to those indicated for this Project and have a record of successful in-service performance.

#### 1.5 WARRANTY

- A. Submit warranties, mutually executed by the manufacturer and the Subcontractor, agreeing to replace emergency lighting products that fail in materials or workmanship within the period specified for each product, beginning on the date of substantial completion of project.

### PART 2 PRODUCTS

#### 2.6 FLUORESCENT EMERGENCY BALLAST

- A. Furnish an NRTL-listed, self-diagnostic, fully automatic, fluorescent emergency ballast in each luminaire indicated on the Drawings.
- B. The normal fluorescent luminaire ballast will operate the lamps during normal conditions; during emergency conditions the fluorescent emergency ballast shall operate one or two of the lamps in the luminaire.
- C. Fluorescent emergency ballast shall be connectable for operation at either 120 or 277 volts and suitable for indoor dry locations with a temperature range of 32 to 130 degrees F.
- D. Fluorescent emergency ballast shall contain a maintenance-free, sealed high-temperature nickel-cadmium or nickel-metal hydride battery with an expected service life of not less than 7 years.

- E. Upon interruption of normal AC power, the internal controller shall automatically switch the emergency lighting load to the battery. The battery shall supply the ballast with power to produce 1100 to 1400 lumens of emergency light output for a minimum of 90 minutes.
- F. Fluorescent emergency ballast shall have a self-diagnostic system that meets the requirements of NFPA 101 and includes the following features:
  - 1. Automatically perform a self-test of battery and lamps for at least 30 seconds at intervals not exceeding 30 days.
  - 2. Automatically perform a self-test of battery and lamps for at least 90 minutes once per year.
  - 3. Any failure shall be indicated by a status indicator.
- G. Fluorescent emergency ballast shall have an LED charging indicator lamp and a push to test switch for installation on the luminaire at locations and positions that will be visible from the floor and operable without removing or opening luminaire lenses or covers.
- H. Fluorescent emergency ballasts shall have not less than a 5 year full warranty.
- I. Manufacturer: Bodine "B50ST" or approved equal.

## 2.7 LED EXIT SIGN

- A. Furnish an NRTL-listed, self-diagnostic, fully automatic, LED illuminated emergency exit sign at each location indicated on the Drawings.
- B. LED emergency exit sign shall be connectable for operation at either 120 or 277 volts and suitable for indoor dry locations with a temperature range of 32 to 104 degrees F.
- C. Exit sign shall have universal mounting capability with all necessary components for each wall, ceiling, or end mounting application.
- D. Exit sign shall be single face or double face with arrows as indicated on the Drawings or as required for each location.
- E. Exit sign shall have a maintenance-free battery, either nickel-cadmium or nickel-metal hydride. Battery shall be field-replaceable and shall have an expected service life of not less than 7 years.
- F. Upon interruption of normal AC power, or brownout conditions exceeding a 20% drop from nominal voltage, the internal controller shall automatically switch the emergency exit sign lighting load to the battery. Emergency power will be provided for a minimum of 90 minutes. During emergency operation, the battery shall be protected from deep discharge by a low-voltage battery disconnect circuit.
- G. Visibility of exit sign during normal or emergency operation shall be not less than that required in UL 924.
- H. LED-illuminated emergency exit sign shall have at least a 5-year full warranty on the unit and electronics and a 5-year full warranty plus additional 5-year pro-rata warranty on the battery.

## PART 3 PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Install emergency lighting system in accordance with the NEC, NECA/IESNA 500, *Recommended Practice for Installing Indoor Commercial Lighting Systems* (ANSI), the manufacturer's instructions, and approved shop drawings. Have the manufacturer's installation instructions available at the construction site.
- B. Mount exit signs and unit emergency lights with bottom of fixture not less than 6'-8" or more than 12'-0" above finished floor.
- C. Connect each emergency power system outlet box using a minimum 2 ft length of flexible wiring method to accommodate not less than 4 inches of differential seismic movement in any direction between the outlet box and the non-flexible raceway system. Refer to Section 26 0533 - Raceways and Boxes for Electrical Systems.
- D. Install slack safety wires as described below for emergency luminaires and exit signs on suspended ceilings.

1. Wire shall be minimum 12 gage galvanized soft annealed steel wire conforming to ASTM A641.
  2. Attach wire to the building structure directly above the attachment point on the box or luminaire; make trapezes of framing channel material as required to span obstacles
  3. Secure wire(s) at each end with not less than three tight turns in 1-1/2 inches.
  4. Use connection devices at the supporting structure, outlet box, and luminaire that are capable of carrying not less than 100 pounds.
- E. Connect fluorescent emergency ballasts to operate two lamps in multi-lamp emergency luminaires.
- F. Install branch circuits for emergency lighting and exit signs in accordance with Article 700 of the National Electrical Code.
1. Connect unit emergency lighting equipment to a branch circuit that serves the general lighting in the area and ahead of any local or remote switches.

### 3.2 ADJUSTING

- A. Aim lamps on wall-mounted emergency lighting units to obtain the following illumination of exit pathway:
1. 1 ft-candle average
  2. 0.1 ft-candle minimum
  3. Maximum-to-minimum uniformity ratio not exceeding 40 to 1.
- B. Test emergency lighting equipment in accordance with the manufacturer's instructions and NECA/IESNA 500.

END OF SECTION

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## SECTION 26 5600 - EXTERIOR LIGHTING

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Exterior luminaires and accessories
- B. Lamps
- C. Ballasts
- D. Poles
- E. Pole foundations
- F. Grounding
- G. Lighting controls

#### 1.2 QUALITY ASSURANCE

- A. Comply with the following codes and standards:
  - 1. *National Electrical Code* (NEC) for components and installation.
  - 2. International Building Code
- B. Provide luminaires listed and labeled by a nationally recognized testing laboratory (NRTL) for the application, installation condition, and the environments in which installed.
- C. Use manufacturers that are experienced in manufacturing poles, luminaires, lamps and ballasts similar to those indicated for this Project and have a record of successful in-service performance.

#### 1.3 SUBMITTALS

- A. Submit the following in accordance with project submittal procedures.
  - 1. Catalog Data: Submit catalog data describing poles, luminaires, lamps, ballasts, and pole and luminaire finishes. Include data substantiating that materials comply with specified requirements. Arrange data for luminaires in the order of luminaire designation.
  - 2. Shop Drawings: Submit manufacturer's drawings for non-standard luminaires.

### PART 2 PRODUCTS

#### 2.4 FINISHES

- A. Furnish luminaires, poles, and accessories with finishes as scheduled that are resistant to fading, chalking, and other changes due to aging and exposure to heat and ultraviolet light. Acceptable finishes for metals are:
  - 1. Hot-dipped galvanized steel: ASTM A 123/A 123M.
  - 2. Brushed natural aluminum
  - 3. Anodized aluminum: AAMA 611, *Anodized Architectural Aluminum*, Class I.
  - 4. Powder coated aluminum: Fluorocarbon polymer powder coating per AAMA 2605, *Superior Performing Organic Coatings* over chrome phosphate conversion coated aluminum.
  - 5. Powder coated steel: Fluorocarbon polymer powder coating per AAMA 2605, *Superior Performing Organic Coatings* over zinc phosphate conversion coated shot-blasted steel.
- B. Reject luminaires, poles, and accessories with finish having runs, streaks, stains, holidays and defects.

- C. Replace luminaires, poles, and accessories showing evidence of yellowing, fading, chalking, and other changes indicating failure during warranty period.
- D. Use stainless steel for exposed hardware.

## 2.5 EXTERIOR LUMINAIRES - GENERAL

- A. Furnish exterior luminaires that comply with requirements specified in this Section and in the luminaire schedule on the Drawings.
- B. Luminaires shall be NRTL-listed as conforming to UL 1598 - *Luminaires*.
- C. Luminaire housing shall be primarily metal.
  - 1. Metal parts shall be free from burrs and sharp corners and edges.
  - 2. Sheet metal components shall be fabricated from corrosion-resistant aluminum, formed and supported to prevent sagging and warping.
  - 3. Exposed fasteners: Stainless steel.
- D. Doors and frames shall be smooth operating and free from light leakage under operating conditions.
  - 1. Relamping shall be possible without the use of special tools.
  - 2. Doors, frames, lenses and diffusers shall be designed to prevent accidental falling during relamping and when secured in the operating position.
  - 3. Door: Removable for cleaning or replacing lens.
- E. Provide lenses, diffusers, covers and globes as scheduled on the Drawings fabricated from materials that are UV stabilized to be resistant to yellowing and other changes due to aging or exposure to heat and ultraviolet radiation.
- F. Doors shall have resilient gaskets that are heat-resistant and aging-resistant to seal and cushion lens and refractor.

## 2.6 LED LUMINAIRES

- A. Conform to UL 1598 and to UL 8250 – *Safety Standard for Light-Emitting Diode (LED) Light Sources for Use in Lighting Products*.
- B. Lead and mercury free.
- C. Photometric characteristics: Established using IESNA LM-79-08, *IESNA Approved Method for the Electrical and Photometric Measurement of Solid-State Lighting Products*.
- D. Ingress protection for optical assembly: IP65 or better in accordance with ANSI/IEC 60529 - *Degrees of Protection Provided by Enclosures*.
- E. Color characteristics as follows in accordance with ANSI C78.377 – *Specifications for the Chromaticity of Solid State Lighting Products*:
  - 1. Color temperature (deg K): 5000 to 6500
  - 2. Color rendering index: not less than 70
- F. LED and driver cooling system: Passive and shall resist the buildup of debris.
- G. LED luminaire output after 50,000 hours of operation: Not less than 70 percent of the initial lumen output when determined in accordance with IESNA LM-80-08 – *IESNA approved Method for Measuring Lumen Maintenance of LED Lighting Sources*.
- H. LED luminaire electrical characteristics:
  - 1. Supply voltage: 120 V, 208 V, 240 V, 277 V, or 480 V as indicated on the Drawings. Provide step-down transformers if required to match driver input voltage rating.
  - 2. Total harmonic distortion (current): Not more than 20 percent



3. Power factor: Not less than 90%
  4. RF interference: Meet FCC 47 CFR Part 15/18
  5. Driver input surge protection device: UL 1449 3<sup>rd</sup> Edition recognized component meeting IEEE C62.41.2 - *IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits*, Category C, High Exposure.
- I. Warranty:
1. Manufacturer shall replace any luminaires that fail to operate properly within 60 months of the substantial completion date of project. Lens yellowing or hazing will be considered a failure.
  2. Manufacturer shall replace any luminaires that experience housing or finish failure within 5 years of the substantial completion date of project

## 2.7 POLES AND ACCESSORIES

- A. Furnish poles and accessories that comply with requirements specified in this Section and the luminaire schedule on the Drawings.
- B. Pole, base, and anchorage shall carry the luminaires, supports, and appurtenances at the indicated height above grade without deflection or whipping.
- C. Mountings, fastenings and other appurtenances shall be fabricated from corrosion-resistant materials that are compatible with poles and luminaires and will not cause galvanic action at contact points. Mountings shall correctly position luminaires to provide scheduled light distribution.
- D. A reinforced access handhole, minimum 2.5 x 5 inches, shall be located in the wall of each metal pole.
- E. A welded 1/2-inch grounding lug shall be accessible through the handhole of each metal pole. Grounding connection shall be designed to prevent electrolysis when used with copper ground wire.
- F. Metal poles shall have anchor type bases and galvanized steel anchor bolts, leveling nuts and bolt covers.
- G. Where poles are indicated as "breakaway" type on the Drawings, each pole shall have a frangible aluminum transformer base that meets the requirements of AASHTO LTS-5.
- H. Each non-breakaway metal pole shall have a metal base cover that covers the entire base plate and anchorage.
- I. Protect painted, anodized, or brushed pole finishes during shipment and installation. Minimum protection shall consist of spirally wrapping each pole shaft with protective paper secured with tape, and shipping small parts in boxes.
- J. Steel poles shall be fabricated from tubing having minimum 7-gage steel with minimum yield/strength of 48,000 psi.
  1. Poles shall be anchor bolt mounted type.
  2. Poles shall be one-piece construction up to 40 feet in length. Poles over 40 feet in length may be in two or more sections with overlapping joints.
  3. Poles shall be tapered, either round in cross section or polygonal. Poles shall have a continuous taper not less than 0.14 inch of diameter per foot of length.
  4. Poles shall be welded construction with no bolts, rivets, or other means of fastening except as specifically approved.
  5. Tops of shafts shall be fitted with a round or tapered cover.
  6. Pole markings shall be approximately 3 to 4 feet above grade and shall include manufacturer, year of manufacture, top and bottom diameters, and length.
  7. Provide poles with finish color indicated on the Drawings and conforming to FINISHES article of this Section. If pole is not galvanized, coat inside of pole with suitable rust-inhibiting finish.
  8. Base covers for steel poles shall be structural-quality, hot-rolled carbon-steel plate having a minimum yield of 36,000 psi. Finish shall be the same as the corresponding poles.

## 2.8 LIGHTING CONTROL EQUIPMENT

- A. Furnish one or more time switches to control exterior lighting as indicated on the Drawings.
  - 1. Use a mechanical astronomic dial type or an electronic type time switch, arranged to turn "ON" at sunset and turn "OFF" at predetermined time between 8:30 p.m. and 2:30 a.m. or sunrise, automatically changing the settings each day in accordance with seasonal changes
  - 2. Time switch shall have either an automatically wound spring mechanism or an energy-storage capacitor to maintain accurate time for a minimum of 7 hours following power failure.
  - 3. Time switch shall have double-throw contacts to switch mechanically-held contactors and a manual on-off bypass switch.
  - 4. Provide time switch with NEMA 3R housing if installed outdoors or NEMA 1 housing if installed indoors.
- B. Furnish a "hand-off-auto" control switch and enclosure to facilitate testing of the lighting system.
- C. Furnish one or more multi-pole lighting contactors to control exterior lighting as indicated on the Drawings.
  - 1. Mechanically-held or contactors shall conform to NEMA ICS 2 Industrial Controls and Systems: Controllers, Contactors, and Overload Relays.
  - 2. Contactors shall have the number of contacts as indicated on the Drawings or as required by the number of circuits to be controlled. Contacts shall have a minimum rating of 30 amperes at 277 volts AC per pole for ballast loads. Contacts shall be field-convertible from normally-open to normally-closed.
  - 3. Use 120 volts AC operating coils.
  - 4. Provide contactor with NEMA 3R housing if installed outdoors or NEMA 1 housing if installed indoors.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Examine areas, spaces, and surfaces to receive exterior luminaire (s) or poles for compliance with installation tolerances and other conditions affecting performance of the product. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Install products in accordance with manufacturer's instructions, NECA/IESNA 501, and approved shop drawings.
- B. Locations of luminaires and poles shown on the Drawings are diagrammatic. Coordinate luminaire locations with building finishes, building structure, paving and striping, utility piping, security fences, and existing trees.
- C. Set poles and luminaires plumb, square, level and secure.
- D. Install surface mounted luminaires directly to an outlet box which is supported from structure.
- E. Install lamps in luminaires in accordance with manufacturer's instructions.

### 3.3 CONCRETE FOUNDATIONS

- A. Construct concrete foundations with exterior 4000 psi concrete and reinforcing conforming to Section 03 3001, *Reinforced Concrete*.
- B. Comply with details on the Drawings and manufacturer's recommendations for foundation dimensions, reinforcing, anchor bolts, nuts and washers.
- C. Position power conduits and ground rod to terminate within the pole shaft area and one inch above the top of the foundation; refer to Section 26 0533, *Raceways and Boxes for Electrical Systems*.

- D. Cure concrete foundations for 7 full curing days before erecting poles.

### 3.4 POLE ERECTION

- A. Do not install poles without luminaires.
- B. Use fabric web slings to raise and set poles.
- C. Use leveling nuts or shims to make poles plumb. When leveling nuts are used, set the lower nuts not more than 1 inch from the concrete foundation.
- D. Tighten anchor bolt nuts and other pole hardware to torque recommended by manufacturer.
- E. After pole is leveled, pack non-shrink grout between anchor base and concrete foundation to provide a full bearing surface. Use a short piece of 1/2-inch diameter pipe to make a drain hole through grout; arrange to drain condensation from interior of pole.
- F. Set embedded poles to depth indicated on the Drawings, but not less than 1/6 of pole length below finish grade.
  - 1. Auger holes large enough to permit the use of tampers the full depth of the hole.
  - 2. Backfill in 6-inch layers and thoroughly tamp each layer so compaction of backfill is equal to or greater than that of the undisturbed earth.

### 3.5 GROUNDING

- A. Install grounding for exterior lighting using materials and methods specified in Section 26 0526, *Grounding and Bonding for Electrical Systems*.
- B. Connect ground lug of metal pole to ground rod using a 6 AWG copper conductor.
- C. Connect ground lug of metal pole to circuit equipment grounding conductor.

### 3.6 LIGHTING CONTROL SYSTEM

- A. Install exterior lighting control system components in accordance with the manufacturers' instructions. Have installation instructions available at the construction site.
- B. Install a HAND-OFF-AUTO selector switch in the control system to allow for testing of luminaires.
- C. Provide separate control of exterior lighting system as follows:
  - 1. Safety, security, pedestrian walkway, and roadway lighting: "ON" at dusk, "OFF" at dawn.
  - 2. Parking facility and landscape lighting: "ON" at dusk, "OFF" at predetermined time.  
Approximately 10 percent of parking lot lighting shall remain on until dawn for personnel security.

### 3.7 FIELD QUALITY CONTROL

- A. Inspect each installed lighting unit for damage. Replace damaged luminaires, poles, and components.
- B. Test installed luminaires for proper operation.
  - 1. Replace or repair malfunctioning luminaires and components then re-test.
  - 2. Repeat procedure until all luminaires operate properly.
- C. Replace inoperative lamps.

### 3.8 ADJUSTING AND CLEANING

- A. Clean each luminaire inside and out, including plastics and glassware. Use methods and materials recommended by manufacturer.
- B. Aim adjustable luminaires to provide required light intensities as indicated on the Drawings.

END OF SECTION

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### **DIVISION 31 - EARTHWORK**

311000	SITE CLEARING
312000	EARTH MOVING

## **SECTION 31 1000 - SITE CLEARING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Clearing and Grubbing
  - 2. Removing above- and below-grade site improvements.
  - 3. Disconnecting, capping, or sealing site utilities.
  - 4. Temporary erosion and sedimentation control.

#### **1.2 MATERIAL OWNERSHIP**

- A. Except for materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

#### **1.3 FIELD CONDITIONS**

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
  - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
  - 2. Provide alternate routes around closed or obstructed trafficways if required by Owner or authorities having jurisdiction.
- B. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.
- C. Do not commence site clearing operations until temporary erosion- and sedimentation-control measures are in place.

### **PART 2 - PRODUCTS**

#### **2.1 MATERIALS**

- A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 31 2000 "Earth Moving."
  - 1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

### **PART 3 - EXECUTION**

#### **3.1 PREPARATION**

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Protect existing site improvements to remain from damage during construction.
  - 1. Restore damaged improvements to their original condition, as acceptable to Owner.

#### **3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL**

- A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.
- B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

- D. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.

### **3.3 EXISTING UTILITIES**

- A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.
  - 1. Arrange with utility companies to shut off indicated utilities.
- B. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others, unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
  - 1. Notify Architect not less than two days in advance of proposed utility interruptions.
  - 2. Do not proceed with utility interruptions without Architect's written permission.
- C. Removal of underground utilities is included in earthwork sections; in applicable fire suppression, plumbing, HVAC, electrical, communications, electronic safety and security, and utilities sections; and in Section 02 4116 "Structure Demolition" and Section 02 4119 "Selective Demolition."

### **3.4 SITE IMPROVEMENTS**

- A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

### **3.5 DISPOSAL OF SURPLUS AND WASTE MATERIALS**

- A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
- B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials, and transport them to recycling facilities. Do not interfere with other Project work.

### **END OF SECTION 31 1000**

## **SECTION 31 2000 - EARTH MOVING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section Includes:
  - 1. Preparing subgrades for slabs-on-grade.
  - 2. Excavating and backfilling for buildings and structures.
  - 3. Drainage course for concrete slabs-on-grade.

#### **1.2 DEFINITIONS**

- A. Backfill: Soil material used to fill an excavation.
  - 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
  - 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.
- C. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- D. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
- E. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
  - 1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
  - 2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.
- F. Fill: Soil materials used to raise existing grades.
- G. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- H. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
- I. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

#### **1.3 QUALITY ASSURANCE**

- A. Preexcavation Conference: Conduct conference at Project site.

#### **1.4 PROJECT CONDITIONS**

- A. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth moving operations.

### **PART 2 - PRODUCTS**

#### **2.1 SOIL MATERIALS**

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.



- B. Satisfactory Soils: Soil Classification Groups GP, GW, SW and SP according to ASTM D 2487, or a combination of these groups; free of rock or gravel larger than 6 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: Soil Classification Groups GM, SM, ML, CL-ML, GC, SC, CL, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.
  - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Structural Fill: Satisfactory soils indicated above with no more than 50 percent oversize (greater than 3/4-inch) material and not more than 12 percent passing a No. 200 sieve.
- E. Drainage Course: Narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

## **2.2 ACCESSORIES**

- A. Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored to comply with local practice or requirements of authorities having jurisdiction.
- B. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored to comply with local practice or requirements of authorities having jurisdiction.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.
- B. Protect and maintain erosion and sedimentation controls during earth moving operations.
- C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

### **3.2 EXCAVATION, GENERAL**

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
  - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

### **3.3 EXCAVATION FOR STRUCTURES**

- A. Prior to the beginning of any other work, in an area under the building and extending five feet in all directions, strip existing soils to a minimum depth of 4 inches to remove organic material and surface debris.
- B. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
  - 1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

### **3.4 SUBGRADE INSPECTION**

- A. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired dump truck to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
- B. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

### **3.5 UNAUTHORIZED EXCAVATION**

- A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Architect.
  - 1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

### **3.6 STORAGE OF SOIL MATERIALS**

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

### **3.7 SOIL FILL**

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
  - 1. Under grass and planted areas, use satisfactory soil material.
  - 2. Under walks and pavements, use satisfactory soil material.
  - 3. Under building slabs, use structural fill.
  - 4. Under footings and foundations, use structural fill.

### **3.8 SOIL MOISTURE CONTROL**

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
  - 1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
  - 2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

### **3.9 COMPACTION OF SOIL BACKFILLS AND FILLS**

- A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:
  - 1. Under structures, building slabs, steps, and pavements, compact each layer of backfill or fill soil material at 95 percent.
  - 2. Under walkways, compact each layer of backfill or fill soil material at 95 percent.
  - 3. Under turf or unpaved areas, compact each layer of backfill or fill soil material at 85 percent.

### **3.10 GRADING**

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

- B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
  - 1. Turf or Unpaved Areas: Plus or minus 1 inch.
  - 2. Walks: Plus or minus 1 inch.
  - 3. Pavements: Plus or minus 1/2 inch.

- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

### **3.11 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE**

- A. Place drainage course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:
  - 1. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

### **3.12 FIELD QUALITY CONTROL**

- A. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.
- C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.
- D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

### **3.13 PROTECTION**

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
  - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

### **3.14 DISPOSAL OF SURPLUS AND WASTE MATERIALS**

- A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

**END OF SECTION 31 2000**