

INVITATION NO.	IFB 18-07	GENERAL CONSTRUCTION
	IFB 18-08	MECHANICAL CONSTRUCTION
	IFB 18-09	ELECTRICAL CONSTRUCTION

Project No. 1715

PROJECT MANUAL NUMBER _____
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**PROJECT MANUAL**  
for  
**USPFO WAREHOUSE REMODEL**  
**BLDG. 6330**  
**Camp Gilbert C. Grafton**  
**Devils Lake, ND**

Bids will be received by The Adjutant General in Bldg 030 at Fraine Barracks, Bismarck, North Dakota until 2:00 PM, 13 March, 2018.

Bidding documents referred to herein upon which all bids for construction work shall be based are as follows:

Title Sheet, Two (2) Architectural Sheets, A3.1 through A3.2, Two (2) Mechanical Sheets, M0.1 through M1.0, Three (3) Electrical Sheets, E0.1 through E2.0, all dated October 5, 2017.

Specifications and sections included in accordance with Table of Contents and any Addenda issued prior to opening of bids.

**CONTRACTING OFFICER**

Brig Gen Robert J. Becklund  
Deputy Adjutant General  
State of North Dakota  
Bismarck, ND 58506-5511  
Phone: (701) 333-2068  
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**ARCHITECT**

Mutchler Bartram Architects  
505 N. Broadway, Suite 201  
Fargo, ND 58102  
Telephone: 701-235-5563  
Fax: 701-235-5435

**MECHANICAL / ELECTRICAL ENGINEER**

MBN Engineering  
503 7<sup>th</sup> Street N  
Fargo, ND 58102  
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DATED: 19 February 2018



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IFB 18-08 MECHANICAL CONSTRUCTION  
IFB 18-09 ELECTRICAL CONSTRUCTION

INVITATION TO BID

**USPFO WAREHOUSE REMODEL  
Bldg. 6330  
Camp Gilbert C. Grafton  
Devils Lake, North Dakota**

Sealed bids for USPFO Warehouse Remodel, Bldg. 6330, Camp Gilbert C. Grafton, Devils Lake, North Dakota will be received by the Adjutant General of the State of North Dakota at Fraine Barracks, Building 030, Bismarck, North Dakota, at 2:00 PM, March 13, 2018, and will be opened and publicly read that date and hour in the space designated. All bids received after the scheduled opening time will be returned to the bidders unopened.

Bidders may submit separate bids only for General construction work (IFB 18-07), Mechanical construction work (IFB 18-08), and/or Electrical construction work (IFB 18-09). No other types of bids for other portions of the project or other combinations of the separate bids will be accepted.

ATTENTION PERSONS WITH DISABILITIES: If you plan to attend the bid opening and will need special facilities or assistance relating to a disability, please contact the National Guard ADA Coordinator at 701-333-2296 by March 6, 2018.

Contractors desiring to submit a bid may obtain a copy of the contract documents at the office of the Owner. No deposit for the contract documents will be required, but they must be returned to the Owner in un mutilated condition within ten (10) days after the opening of bids. Copies of the proposed contract documents are limited to one (1) set per bidder. **Requests must be made on Contractor's own letterhead and must include a copy of his North Dakota Contractor's License or Certificate of Renewal, whichever is current.**

**OWNER**

**Office of the Adjutant General  
Contract Management Branch  
P.O. Box 5511  
Bismarck, North Dakota 58506-5511  
Telephone: (701) 333-2068**

Copies of the contract documents are on file at the Construction Plans Exchange in Bismarck; Builders Exchanges in Dickinson, Fargo, Grand Forks, Mandan, and Minot, North Dakota; Impact Procurement Technical Assistance Center, Fargo, North Dakota, Minnesota Builders Exchange in Minneapolis, Minnesota, and at the offices of the Architect and the Owner.

Each bid shall be submitted in duplicate copy on the forms provided by the Owner and enclosed in a sealed opaque envelope upon which there is disclosed the necessary information as required by Supplementary Instructions to Bidders.

Each bid shall be accompanied by a separate sealed opaque envelope containing a bidder's bond made payable to The Adjutant General, State of North Dakota, and executed by the bidder as principle and by a surety company authorized to do business in North Dakota, in a sum equal to five percent (5%) of the bidder's highest total bid combination, including all add alternates to the bid items; conditioned that if bidder's proposal be accepted and the contract awarded to him, he within ten (10) days after notice of such award, will effect and execute a contract in accordance with the terms of his bid and a contractor's bond as required by law and the regulations and determinations of the Owner. AIA Document A310, Bid Bond, will be furnished by the Owner and should be used to execute the bid guarantee.

In compliance with Section 43-07-12 of the North Dakota Century Code, each contractor submitting a bid must have a copy of his North Dakota Contractor's License or certificate of renewal thereof issued by the secretary of state enclosed in the bid bond envelope; must be licensed for the highest amount of his total bid combination including add alternates; and such license must have been in effect at least ten (10) days prior to the date of the bid opening.

No bid will be read or considered which does not fully comply with the provisions herein as to bonds and licenses, and any deficient bid submitted will be resealed and returned to bidder immediately.

The Owner reserves the right to hold all legitimate bids for a period of thirty (30) days after the date fixed for the opening thereof. It is the intent of the Owner to award a contract to the lowest and best bidder. The Owner further reserves the right to reject any and all bids and to waive irregularities, and shall incur no legal liability for the State for the payment of any monies until the contract is awarded and approved by the proper authorities.

In compliance with Section 48-01.2-10 of the North Dakota Century Code, the successful bidder shall be required to furnish bonds covering the faithful performance of the Contract and the payment of all obligations thereunder, and all additional obligations required by the laws of the state of North Dakota. Each bond shall be in an amount equal to the full contract sum.

DATED: Feb 19, 2018

OFFICE OF THE ADJUTANT GENERAL  
Bismarck, North Dakota

By: /s/ ROBERT J. BECKLUND  
Brigadier General, NDNG  
Deputy Adjutant General  
Contracting Officer



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

## ***Instructions to Bidders***

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

**THE OWNER:**  
(Name, legal status and address)

**THE ARCHITECT:**  
(Name, legal status and address)

### **TABLE OF ARTICLES**

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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.

# SUPPLEMENTARY INSTRUCTIONS TO BIDDERS

THESE SUPPLEMENTARY INSTRUCTIONS TO BIDDERS CONTAIN CHANGES AND ADDITIONS TO AIA DOCUMENT A701, CROSS REFERENCED TO THE ORIGINAL ARTICLE NUMBER IN AIA DOCUMENT A701. WHERE ANY PART OF AIA DOCUMENT A701 IS NOT MODIFIED OR VOIDED BY THESE SUPPLEMENTARY INSTRUCTIONS TO BIDDERS, THE UNALTERED PART REMAINS IN AFFECT.

## ARTICLE 2

### BIDDER'S REPRESENTATIONS

#### ADD THE FOLLOWING SUBPARAGRAPHS AND PARAGRAPH:

2.1.5 The prices in this Bid have been arrived at independently, without consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other Bidder or with any competitor.

2.1.6 Unless otherwise required by law, the prices which have been quoted in this Bid have not been knowingly disclosed by the Bidder and will not knowingly be disclosed by the Bidder prior to bid opening, directly or indirectly, to any other Bidder or to any competitor.

2.1.7 No attempt has been made or will be made by the Bidder to induce any other person or firm to submit or not to submit a Bid for the purpose of restricting competition.

#### 2.2 SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK

2.2.1 The Bidder acknowledges that the Bidder has taken steps reasonably necessary to ascertain the nature and location of the Work, and that the Bidder has investigated and is satisfied as to the general and local conditions which can affect the Work or its cost, including but not limited to

- .1 conditions bearing upon transportation, disposal, handling, and storage of materials;
- .2 the availability of labor, water, electric power, and roads;
- .3 uncertainties of weather, river stages, tides, or similar physical conditions at the site;
- .4 the conformation and conditions of the ground; and
- .5 the character of equipment and facilities needed preliminary to and during work performance.

2.2.2 The Bidder also acknowledges that the Bidder has is satisfied as to the character, quality and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including all exploratory work done by the Owner, as well as from the drawings and specifications made a part of the Bidding Documents. Any failure of the Bidder to take the actions

described and acknowledged in this paragraph will not relieve the Bidder from responsibility for estimating properly the difficulty and cost of successfully performing the Work, or for proceeding to successfully perform the Work without additional expense to the Owner.

2.2.3 The Owner assumes no responsibility for any conclusions or interpretations made by the Bidder based on the information made available by the Owner. Nor does the Owner assume responsibility for any understanding reached or representation made concerning conditions which can affect the Work by any of its officers or agents before the execution of this contract, unless that understanding or representation is expressly stated in this Contract.

## ARTICLE 3

### BIDDING DOCUMENTS

#### SUBPARAGRAPH 3.2.2: MODIFY CONTENT BY CHANGING IT TO READ:

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

#### PARAGRAPH 3.2: ADD THE FOLLOWING SUBPARAGRAPH:

3.2.4 Where a clear understanding of the work is prevented due to contradictions between the drawings and the specifications, and there is not sufficient time to make an interpretation, correction, or change as per subparagraph 3.2.3, the Bidder shall consider the more restrictive conditions as governing and/or shall bid the larger quantity or better quality of work. Appropriate adjustment, if required, will be made after contract award.

#### SUBPARAGRAPH 3.3.4: MODIFY CONTENT BY CHANGING IT TO READ:

3.3.4 No substitutions will be considered after the Contract award unless specifically provided in the Contract Documents. Under no condition, shall bids be submitted on work or materials not approved by Architect for this specific project, even though approval might have been given on other projects previously.

**PARAGRAPH 3.3: ADD THE FOLLOWING SUBPARAGRAPHS:**

3.3.5 Those requesting Architect consideration of their products as "equal" in accord with subparagraph 3.3.2, shall make such request in electronic PDF format providing space for Architect approval and/or comments on each item requested. An electronic PDF copy of the request form, with Architect action on same, will be returned to the proposer.

3.3.6 Bidders and Sub-bidders submitting proposals on individually specified items of Work or on Work included in complete Specification sections, must quote in accord with all requirements of Plans and Specifications without modification or exclusion.

**SUBPARAGRAPH 3.4.3: MODIFY CONTENT BY CHANGING IT TO READ:**

3.4.3 No Addenda will be issued 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, or one which includes additional prior approvals, or one which is essential to the bidding process.

**SUBPARAGRAPH 3.4.4: MODIFY CONTENT BY CHANGING IT TO READ:**

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 receipt of all Addenda on the Bid Form. Failure to acknowledge all Addenda may cause rejection of Bid.

## **ARTICLE 4**

### **BIDDING PROCEDURES**

**SUBPARAGRAPH 4.1.1: DELETE IN ITS ENTIRETY AND SUBSTITUTE THE FOLLOWING:**

4.1.1 Bids shall be submitted in duplicate copy on forms provided by the Owner, a sample of which is included with the Bidding Documents. Owner shall furnish said forms to all registered planholders approximately seven (7) calendar days prior to date of Bid Opening.

**SUBPARAGRAPH 4.2.1: MODIFY CONTENT BY CHANGING IT TO READ:**

4.2.1 Each Bid shall be accompanied by a bid security in the form and amount required if so stipulated in the advertisement or Invitation to Bid. 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 and all additional obligations required by the laws of the state of North Dakota. 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 paragraph 6.2.

**SUBPARAGRAPH 4.2.2: DELETE IN ITS ENTIRETY AND SUBSTITUTE THE FOLLOWING:**

4.2.2 If a surety bond is required, it may be secured through the Bidder's usual sources provided the surety is licensed to do business in the state of North Dakota. 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 attorney-in-fact's power of attorney. AIA Document A310, Bid Bond, will be provided by the Owner and should be used to execute the surety bond.

**SUBPARAGRAPH 4.3.1: DELETE IN ITS ENTIRETY AND SUBSTITUTE THE FOLLOWING:**

4.3.1 All copies of the Bid (NOT TO INCLUDE the Bid Security and Contractor's License) shall be enclosed in a sealed opaque envelope addressed to the party receiving Bids and shall have disclosed upon it the following information:

- .1 The name and address of the person, firm, or corporation submitting the Bid.**
- .2 Project name.**
- .3 Bid Invitation No. (IFB No.)**
- .4 Type of Bid (i.e. Total Construction, General, Mechanical, Electrical, etc.)**

If a Bidder is submitting more than one type of Bid (i.e. Total Construction and General, Mechanical, or Electrical, etc.) each type of Bid must be submitted as a separate Bid in conformance with the requirements of this paragraph 4.3.1. Bid security shall accompany the Bid and shall be enclosed in a separate sealed opaque envelope, plainly marked on the outside of envelope as to which Bid it is submitted in conjunction with. If the Bid and Bid Security are sent by mail, both sealed envelopes shall be enclosed in a separate mailing envelope with the notation "SEALED BID & BID SECURITY ENCLOSED," on the face thereof. A copy of the Bidder's North Dakota Contractor's License or Certificate of Renewal thereof issued by Secretary of State must be enclosed with the bid security in the required bid security envelope. A Bid submitted without said certificate properly enclosed in the bid security envelope shall not be read or considered and shall be returned to the Bidder.



**PARAGRAPH 4.3: ADD THE FOLLOWING SUBPARAGRAPH:**

4.3.5 Any Bid received at the office designated in the solicitation after the exact time specified for receipt will not be considered unless it is received before award is made and it is determined by the Owner that the late receipt was due solely to mishandling by the Owner after receipt at the Owner's installation.

**SUBPARAGRAPH 4.4.2: DELETE IN ITS ENTIRETY AND SUBSTITUTE THE FOLLOWING:**

4.4.2 Prior to the time and date designated for receipt of Bids, a Bid submitted may be modified or withdrawn by written notice to the party receiving Bids at the place designated for receipt of Bids. The modification or withdrawal must contain the signature of an individual authorized to make such modification or withdrawal. A modification or withdrawal may be submitted by facsimile machine to FAX No. 701-333-2067. The facsimile signature will be considered an original signature and written confirmation by mail is not required. A MODIFICATION SHALL BE SO WORDED AS NOT TO REVEAL THE AMOUNT OF THE ORIGINAL BID.

**SUBPARAGRAPH 4.4.4: MODIFY CONTENT BY CHANGING IT TO READ:**

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

**PARAGRAPH 4.4: ADD THE FOLLOWING SUBPARAGRAPH:**

4.4.5 Any modification or withdrawal of a Bid is subject to the same conditions as in subparagraph 4.3.5 except that a late modification of an otherwise successful Bid that makes its terms more favorable to the Owner will be considered at any time it is received and may be accepted.

## **ARTICLE 5**

### **CONSIDERATION OF BIDS**

**PARAGRAPH 5.3: MODIFY CONTENT BY CHANGING THE FOLLOWING SUBPARAGRAPHS TO READ:**

5.3.1 It is the intent of the Owner to award a Contract to the lowest and best 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 Bid Items and Alternates in any order or combination, unless otherwise specifically provided in the Specifications, and to determine the lowest and best Bidder on the basis of the sum of the Bid Items and Alternates accepted.

**ADD THE FOLLOWING SUBPARAGRAPH:**

5.3.3 If this Contract is funded in whole or in part with federal funds, the Owner shall not make any award or permit any award (subcontract) at any tier to any party which is debarred or suspended or is otherwise excluded from or ineligible for participation in federal assistance programs under Executive Order 12549 "Debarment and Suspension".

## **ARTICLE 7**

### **PERFORMANCE BOND AND PAYMENT BOND**

**SUBPARAGRAPH 7.1.1: DELETE IN ITS ENTIRETY AND SUBSTITUTE THE FOLLOWING:**

7.1.1 If stipulated in the Invitation to Bid, the Bidder shall furnish bonds covering the faithful performance of the Contract and the payment of all obligations arising thereunder. Such bonds must cover all additional obligations required by the laws of the state of North Dakota.

**SUBPARAGRAPH 7.1.3: DELETE IN ITS ENTIRETY AND SUBSTITUTE THE FOLLOWING:**

7.1.3 Required performance and payment bonds shall be secured through a surety licensed to do business within the state of North Dakota. If any surety upon any bond furnished in connection with the Contract becomes unacceptable to the state of North Dakota, or if any such surety fails to furnish reports as to the financial conditions of the surety from time to time as requested by the state of North Dakota, or if the Contract price is increased so that the penal sum of any bond becomes inadequate in the opinion of the Contracting Officer, the Contractor shall promptly furnish such additional security as may be required from time to time to protect the interests of the state of North Dakota and of persons supplying labor or materials in the prosecution of the Work contemplated by this Contract.

**PARAGRAPH 7.1: ADD THE FOLLOWING SUBPARAGRAPH:**

7.1.4 Companies executing the bond as sureties must be among those appearing in the Treasury Department's list of approved sureties and must be acting within the limitations set forth therein.

**PARAGRAPH 7.2: MODIFY CONTENT BY CHANGING THE FOLLOWING SUB-PARAGRAPHS TO READ:**

7.2.1 The Bidder shall deliver the required bonds to the Owner within ten days of notification of award of a contract for the Work. 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 subparagraph.

7.2.3 The bonds shall be dated the same as the date of the Contract.

## **ARTICLE 9**

### **SUPPLEMENTARY INSTRUCTIONS**

**ARTICLE 9: ADD THE FOLLOWING PARAGRAPHS:**

#### **9.1 CONTRACTOR REQUIREMENTS**

9.1.1 In compliance with Section 43-07-12 of the North Dakota Century Code, each Bidder submitting a Bid must have a state Contractor's License for the highest amount of the Bidder's total Bid combination, including add alternates, and such license must have been in effect at least ten (10) days prior to the date of Bid Opening.

9.1.2 The following submissions will be required from the successful Bidder prior to execution of the Contract:

- .1 Performance Bond and Payment Bond as required by the Invitation to Bid.
- .2 Certificate of Premium Payment to North Dakota Workforce Safety and Insurance.
- .3 Certificate of Insurance in such amounts as prescribed in the Supplementary General Conditions of the Contract for Construction (AGND Document 415).
- .4 Statement of North Dakota Tax Commissioner relating to income tax and sales tax clearance.
- .5 Data Universal Numbering System (DUNS) Number on contracts over \$25,000 (for compliance with the Federal Funding Accountability and Transparency Act of 2006).

9.1.3 Prior to the start of any work, to include the shipping of any materials, Builder's "All Risk" Insurance shall be effected and maintained in such amount as prescribed in the Supplementary General Conditions of the Contract for Construction (AGND Document 415).

9.1.4 A pre-construction conference will be held at the job site prior to commencement of work to fully inform Contractor of the administrative requirements associated with this Contract and to coordinate construction operations in general. The Contractor will be notified of the date and time of said conference. The Contractor or the Contractor's representative along with representatives

from the major subcontractors as specified by Owner and/or Architect will be required to attend.

#### **9.2 SUBCONTRACTOR REQUIREMENTS**

9.2.1 All Subcontractors and Sub-subcontractors submitted in accordance with Paragraph 6.3 of Instructions to Bidders (AIA Document A701) whose subcontract cost, value, or price exceeds the sum of \$2,000.00 shall have in possession at the time of said submittal, a current North Dakota Contractor's License in compliance with the limits as specified in Section 43-07-05 of the North Dakota Century Code.

9.2.2 The following submissions will be required from every Subcontractor and Sub-subcontractor prior to employment on the job site:

- .1 Subcontractor Statement and Acknowledgment, AGND Document 435S, acknowledging that the terms and conditions of the Contract Documents are incorporated into and made a part of their subcontract.
- .2 Certificate of Premium Payment to North Dakota Workforce Safety and Insurance.
- .3 Statement of North Dakota Tax Commissioner relating to income tax and sales tax clearance.
- .4 Copy of North Dakota Contractor's License or Certificate of Renewal, whichever is applicable, as per subparagraph 9.2.1.

#### **9.3 LIQUIDATED DAMAGES**

9.3.1 A liquidated damages clause is set forth in this Contract. Refer to the Supplementary General Conditions (AGND Document 415) for liquidated damages that may be assessed under this Contract.

#### **9.4 RESIDENT CONTRACTOR PREFERENCE**

9.4.1 Selection of successful Bidder and award of Contract will be subject to North Dakota Century Code 44-08-01 which states in part that state agencies shall, in contracting to build or repair any building, structure, road, or other real property, give preference to contractors resident in North Dakota. The preference shall be equal to the preference given or required by the state of the nonresident contractor.

#### **9.5 PRE-BID CONFERENCE**

9.5.1 If stipulated in the Invitation to Bid, a pre-bid conference will be held for the purpose of considering questions posed by the Bidders. The exact location and time of the conference will be announced to all Bidders of record.

#### **9.6 SITE VISITATION**

9.6.1 Visits to the work site may be arranged during duty hours, 8:00 AM to 4:00 PM, Monday through Friday, by contacting the office of the Director of Facilities Engineering, Bldg 030, Fraine Barracks, Bismarck, North Dakota. Telephone: (701) 333-2066.

GENERAL CONSTRUCTION  
INVITATION NO: IFB 18-07

Office of the Adjutant General  
ATTN: NGND-DFE-CM  
030 Fraine Barracks Lane (58504)  
P.O. Box 5511  
Bismarck, North Dakota 58506-5511

13 March 2018

The undersigned being familiar with the local conditions affecting the cost of the work, and after careful and complete examination of the Invitation to Bid, Instructions to Bidders, Bid Form, and Contract Documents; including Contract, General and Additional Conditions, Specifications, and Drawings as prepared by Mutchler & Bartram Architects, Fargo, North Dakota and their consultants; and Office of the Adjutant General, Division of Facilities Engineering; and issued Addenda No.'s \_\_\_\_\_; hereby proposes to furnish all labor, materials, equipment and services required for USPFO WAREHOUSE REMODEL Bldg. 6330, Camp Gilbert C. Grafton, Devils Lake, North Dakota, in accordance with the following:

BID ITEM NO. G-1: (USPFO Warehouse Remodel - General Construction):

\_\_\_\_\_  
\_\_\_\_\_ Dollars \$ \_\_\_\_\_

The undersigned agrees to start and complete all work within the time limits set forth in Construction Schedule section of the specifications.

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GENERAL CONSTRUCTION  
INVITATION NO: IFB 18-07 (con't)

Accompanying this bid, but in a separate sealed envelope, is a bidder's bond in a sum equal to five percent (5%) of the total bid, including all add alternates, which shall be forfeited to the Owner should the bidder fail to effect a contract and deliver Surety Bonds and other documents required by Instructions to Bidders within ten (10) days after receipt of notice to award.

In submitting this bid, it is understood that the right is reserved by the Owner to reject any or all bids, and it is agreed that this bid may not be withdrawn for a period of thirty (30) days after the opening of bids.

In compliance with the laws of the State of North Dakota, the undersigned is a licensed contractor duly registered with the Secretary of State under License Number \_\_\_\_\_, Class \_\_\_\_\_, which license has been renewed or granted on the \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_.

The names of all persons interested in the foregoing bid as principals are:

*(NOTE: If bidder or other interested person is a corporation, give legal name of corporation, state where incorporated, and names of president and secretary thereof; if a partnership, give name of firm and names of all individual co-partners composing the firm; if bidder or other interested person is an individual, give first and last names in full.)*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Respectfully submitted,

FIRM: \_\_\_\_\_

BY: \_\_\_\_\_

(Signature)

TITLE: \_\_\_\_\_

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

(Include P.O. Box No.)

\_\_\_\_\_  
\_\_\_\_\_

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

Telephone No.: \_\_\_\_\_

Fax No.: \_\_\_\_\_



MECHANICAL CONSTRUCTION  
INVITATION NO: IFB 18-08

Office of the Adjutant General  
ATTN: NGND-DFE-CM  
030 Fraine Barracks Lane (58504)  
P.O. Box 5511  
Bismarck, North Dakota 58506-5511

13 March 2018

The undersigned being familiar with the local conditions affecting the cost of the work, and after careful and complete examination of the Invitation to Bid, Instructions to Bidders, Bid Form, and Contract Documents; including Contract, General and Additional Conditions, Specifications, and Drawings as prepared by Mutchler & Bartram Architects, Fargo, North Dakota and their consultants; and Office of the Adjutant General, Division of Facilities Engineering; and issued Addenda No.'s \_\_\_\_\_; hereby proposes to furnish all labor, materials, equipment and services required for USPFO WAREHOUSE REMODEL Bldg. 6330, Camp Gilbert C. Grafton, Devils Lake, North Dakota, in accordance with the following:

BID ITEM NO. M-1: (USPFO Warehouse Remodel - Mechanical Construction):

\_\_\_\_\_  
\_\_\_\_\_ Dollars \$ \_\_\_\_\_

The undersigned agrees to start and complete all work within the time limits set forth in Construction Schedule section of the specifications.

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**MECHANICAL CONSTRUCTION**  
**INVITATION NO: IFB 18-08(con't)**

Accompanying this bid, but in a separate sealed envelope, is a bidder's bond in a sum equal to five percent (5%) of the total bid, including all add alternates, which shall be forfeited to the Owner should the bidder fail to effect a contract and deliver Surety Bonds and other documents required by Instructions to Bidders within ten (10) days after receipt of notice to award.

In submitting this bid, it is understood that the right is reserved by the Owner to reject any or all bids, and it is agreed that this bid may not be withdrawn for a period of thirty (30) days after the opening of bids.

In compliance with the laws of the State of North Dakota, the undersigned is a licensed contractor duly registered with the Secretary of State under License Number \_\_\_\_\_, Class \_\_\_\_\_, which license has been renewed or granted on the \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_.

The names of all persons interested in the foregoing bid as principals are:

*(NOTE: If bidder or other interested person is a corporation, give legal name of corporation, state where incorporated, and names of president and secretary thereof; if a partnership, give name of firm and names of all individual co-partners composing the firm; if bidder or other interested person is an individual, give first and last names in full.)*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Respectfully submitted,

FIRM: \_\_\_\_\_

BY: \_\_\_\_\_

(Signature)

TITLE: \_\_\_\_\_

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

(Include P.O. Box No.)

\_\_\_\_\_  
\_\_\_\_\_

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

Telephone No.: \_\_\_\_\_

Fax No.: \_\_\_\_\_



ELECTRICAL CONSTRUCTION  
INVITATION NO: IFB 18-09

Office of the Adjutant General  
ATTN: NGND-DFE-CM  
030 Fraine Barracks Lane (58504)  
P.O. Box 5511  
Bismarck, North Dakota 58506-5511

13 March 2018

The undersigned being familiar with the local conditions affecting the cost of the work, and after careful and complete examination of the Invitation to Bid, Instructions to Bidders, Bid Form, and Contract Documents; including Contract, General and Additional Conditions, Specifications, and Drawings as prepared by Mutchler & Bartram Architects, Fargo, North Dakota and their consultants; and Office of the Adjutant General, Division of Facilities Engineering; and issued Addenda No.'s \_\_\_\_\_; hereby proposes to furnish all labor, materials, equipment and services required for USPFO WAREHOUSE REMODEL Bldg. 6330, Camp Gilbert C. Grafton, Devils Lake, North Dakota, in accordance with the following:

BID ITEM NO. E-1: (USPFO Warehouse Remodel - Electrical Construction):

\_\_\_\_\_  
\_\_\_\_\_Dollars \$ \_\_\_\_\_

The undersigned agrees to start and complete all work within the time limits set forth in Construction Schedule section of the specifications.

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**ELECTRICAL CONSTRUCTION**  
**INVITATION NO: IFB 18-09 (con't)**

Accompanying this bid, but in a separate sealed envelope, is a bidder's bond in a sum equal to five percent (5%) of the total bid, including all add alternates, which shall be forfeited to the Owner should the bidder fail to effect a contract and deliver Surety Bonds and other documents required by Instructions to Bidders within ten (10) days after receipt of notice to award.

In submitting this bid, it is understood that the right is reserved by the Owner to reject any or all bids, and it is agreed that this bid may not be withdrawn for a period of thirty (30) days after the opening of bids.

In compliance with the laws of the State of North Dakota, the undersigned is a licensed contractor duly registered with the Secretary of State under License Number \_\_\_\_\_, Class \_\_\_\_\_, which license has been renewed or granted on the \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_.

The names of all persons interested in the foregoing bid as principals are:

*(NOTE: If bidder or other interested person is a corporation, give legal name of corporation, state where incorporated, and names of president and secretary thereof; if a partnership, give name of firm and names of all individual co-partners composing the firm; if bidder or other interested person is an individual, give first and last names in full.)*

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Respectfully submitted,

FIRM: \_\_\_\_\_

BY: \_\_\_\_\_

(Signature)

TITLE: \_\_\_\_\_

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

(Include P.O. Box No.)

\_\_\_\_\_  
\_\_\_\_\_

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

Telephone No.: \_\_\_\_\_

Fax No.: \_\_\_\_\_





# Document A310™ – 2010

## Bid Bond

**CONTRACTOR:**

*(Name, legal status and address)*

**SURETY:**

*(Name, legal status and principal place of business)*

**OWNER:**

*(Name, legal status and address)*

**BOND AMOUNT: \$****PROJECT:**

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

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

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

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

**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.

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User Notes:

(3B9ADA1E)





Signed and sealed this    day of    ,

\_\_\_\_\_  
(Witness)

\_\_\_\_\_  
(Witness)

\_\_\_\_\_  
(Contractor as Principal)

\_\_\_\_\_  
(Seal)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Surety)

\_\_\_\_\_  
(Seal)

\_\_\_\_\_  
(Title)

Init.

/



(Bid Bond Con't)

ACKNOWLEDGMENT OF PRINCIPAL (INDIVIDUAL)

STATE OF \_\_\_\_\_  
COUNTY OF \_\_\_\_\_

On this \_\_\_\_\_ day of \_\_\_\_\_, in the year \_\_\_\_\_, before me personally appeared \_\_\_\_\_, known to me to be the person who is described in and who executed the foregoing instrument and acknowledged to me that he executed the same.

(SEAL)

\_\_\_\_\_  
(Notary Public)

ACKNOWLEDGMENT OF PRINCIPAL (PARTNERSHIP)

STATE OF \_\_\_\_\_  
COUNTY OF \_\_\_\_\_

On this \_\_\_\_\_ day of \_\_\_\_\_, in the year \_\_\_\_\_, before me personally appeared \_\_\_\_\_, a member of the co-partnership of \_\_\_\_\_, known to me to be the person who is described in and who executed the foregoing instrument and acknowledged to me that he executed the same as and for the act and deed of the said co-partnership.

(SEAL)

\_\_\_\_\_  
(Notary Public)

ACKNOWLEDGMENT OF PRINCIPAL (CORPORATION)

STATE OF \_\_\_\_\_  
COUNTY OF \_\_\_\_\_

On this \_\_\_\_\_ day of \_\_\_\_\_, in the year \_\_\_\_\_, before me personally appeared \_\_\_\_\_, known to me to be the \_\_\_\_\_ of \_\_\_\_\_, the corporation described in and which executed the foregoing instrument, and acknowledged to me that such corporation executed the same.

(SEAL)

\_\_\_\_\_  
(Notary Public)

ACKNOWLEDGMENT OF SURETY (ATTORNEY-IN-FACT)

STATE OF \_\_\_\_\_  
COUNTY OF \_\_\_\_\_

On this \_\_\_\_\_ day of \_\_\_\_\_, in the year \_\_\_\_\_, before me personally appeared \_\_\_\_\_, known to me to be the Attorney-in-Fact of \_\_\_\_\_, the company described in and which executed the foregoing instrument; and acknowledged to me that he signed said instrument as Attorney-in-Fact of the said company and subscribed the name of \_\_\_\_\_, thereof as surety, and his own name as Attorney-in-Fact.

(SEAL)

\_\_\_\_\_  
(Notary Public)



# **AIA**® Document A101™ – 2007

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

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

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

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

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

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

The Owner and Contractor agree as follows.

### **ADDITIONS AND DELETIONS:**

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

AIA Document A201™–2007, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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## TABLE OF ARTICLES

- 1 THE CONTRACT DOCUMENTS
- 2 THE WORK OF THIS CONTRACT
- 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
- 4 CONTRACT SUM
- 5 PAYMENTS
- 6 DISPUTE RESOLUTION
- 7 TERMINATION OR SUSPENSION
- 8 MISCELLANEOUS PROVISIONS
- 9 ENUMERATION OF CONTRACT DOCUMENTS
- 10 INSURANCE AND BONDS

### ARTICLE 1 THE CONTRACT DOCUMENTS

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

### ARTICLE 2 THE WORK OF THIS CONTRACT

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

### ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.

*(Insert the date of commencement if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)*

Date of commencement shall be the date of Contractor's receipt of Notice to Proceed.

If, prior to the commencement of the Work, the Owner requires time to file mortgages and other security interests, the Owner's time requirement shall be as follows:

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

§ 3.3 The Contractor shall achieve Substantial Completion of the entire Work not later than ( ) days from the date of commencement, or as follows:

*(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. If appropriate, insert requirements for earlier Substantial Completion of certain portions of the Work.)*

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The completion date is based on Contractors receiving Notice to Proceed by, as per subparagraph .01 of Specification Section 01100, Summary of Work.

(Table Deleted)

, subject to adjustments of this Contract Time as provided in the Contract Documents.  
(Insert provisions, if any, for liquidated damages relating to failure to achieve Substantial Completion on time or for bonus payments for early completion of the Work.)

Scheduled completion date carries a liquidated damages clause which is referenced in Article 13 Supplementary General Conditions of the Contract for Construction (AGND Document 415).

**ARTICLE 4 CONTRACT SUM**

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

**§ 4.2** The Contract Sum is based upon the following bid items and alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:  
(State the numbers or other identification of 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.)

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

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

**§ 4.4** Allowances included in the Contract Sum, if any:  
(Identify allowance and state exclusions, if any, from the allowance price.)

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

**ARTICLE 5 PAYMENTS**

**§ 5.1 PROGRESS PAYMENTS**

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

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

The period by each Application for Payment shall be one calendar month ending on the TWENTIETH day of the month NOT the last day of the month, except the month of June.

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

*The Owner requires THIRTY days AFTER Owner's receipt of Certificate of Payment from the Architect/Engineer for processing and issuing of payment.*

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

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

**§ 5.1.6** Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

- .1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of TEN percent ( 10.00 %). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 7.3.9 of AIA Document A201™–2007, General Conditions of the Contract for Construction;
- .2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of TEN percent ( 10.00 %);
- .3 Subtract the aggregate of previous payments made by the Owner; and
- .4 Subtract amounts, if any, for which the Architect has withheld or nullified a Certificate for Payment as provided in Section 9.5 of AIA Document A201–2007.

**§ 5.1.7** The progress payment amount determined in accordance with Section 5.1.6 shall be further modified under the following circumstances:

- .1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to the full amount of the Contract Sum, less such amounts as the Architect shall determine for incomplete Work, retainage applicable to such work and unsettled claims; and  
*(Section 9.8.5 of AIA Document A201–2007 requires release of applicable retainage upon Substantial Completion of Work with consent of surety, if any.)*
- .2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10.3 of AIA Document A201–2007.

**§ 5.1.8** Reduction or limitation of retainage, if any, shall be as follows:

*(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Sections 5.1.6.1 and 5.1.6.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)*

Application for payment shall reflect a retainage equal to 10% of Contractor's Application for Payment until the contract is 50% complete. When 95% complete, up to 95% of the amount previously retained may be paid at the discretion of the Architect/Engineer.

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

## **§ 5.2 FINAL PAYMENT**

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

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 12.2.2 of AIA Document A201–2007, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.

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

The Owner's final payment to the Contractor shall be made no later than 30 days AFTER THE OWNER'S RECEIPT of the Architect's final Certificate of Payment.

## ARTICLE 6 DISPUTE RESOLUTION

### § 6.1 INITIAL DECISION MAKER

The Architect will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A201–2007, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.

*(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)*

### § 6.2 BINDING DISPUTE RESOLUTION

For any Claim subject to, but not resolved by, mediation pursuant to Section 15.3 of AIA Document A201–2007, the method of binding dispute resolution shall be as follows:

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

☐ Arbitration pursuant to Section 15.4 of AIA Document A201–2007

☐ Litigation in a court of competent jurisdiction

☒ Other *(Specify)*

Reference AGND Document 415, Supplementary General Conditions of the Contract for Construction; Article 15 Claims and Disputes; paragraph 15.3.

## ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2007.

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2007.

## ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2007 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

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

Interest rates shall be in accordance with paragraph 13.6 of Supplementary General Conditions of the Contract for Construction (AGND Document 415).

§ 8.3 The Owner's representative:

*(Name, address and other information)*

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

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

§ 8.6 Other provisions:

None

#### ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 9.1.1 The Agreement is this executed AIA Document A101–2007, Standard Form of Agreement Between Owner and Contractor.

§ 9.1.2 The General Conditions are AIA Document A201–2007, General Conditions of the Contract for Construction.

§ 9.1.3 The Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
AGND Document 415	Supplementary General Conditions of the Contract for Construction	April 2015	1 - 10
AGND Document 419	Federal Provisions	October 2015	1 - 2

§ 9.1.4 The Specifications:  
(Either list the Specifications here or refer to an exhibit attached to this Agreement.)

Section	Title	Date	Pages
---------	-------	------	-------

§ 9.1.5 The Drawings:  
(Either list the Drawings here or refer to an exhibit attached to this Agreement.)

Number	Title	Date
--------	-------	------

§ 9.1.6 The Addenda, if any:

**Number****Date****Pages**

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

§ 9.1.7 Additional documents, if any, forming part of the Contract Documents:

- .1 AIA Document E201™-2007, Digital Data Protocol Exhibit, if completed by the parties, or the following:
- .2 Other documents, if any, listed below:  
*(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201-2007 provides that bidding requirements such as advertisement or invitation to bid, Instructions to Bidders, sample forms and the Contractor's bid are not part of the Contract Documents unless enumerated in this Agreement. They should be listed here only if intended to be part of the Contract Documents.)*

Number	Title	Date
IFB	Invitation to Bid	
AIA Document 701	Instructions to Bidders	1997 Edition
AGND Document 411	Supplementary Instructions to Bidders	June 2011 Edition
N/A	Contractor's Bid Form	
N/A	Contractor's Bid Bond	

**ARTICLE 10 INSURANCE AND BONDS**

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A201-2007.

*(State bonding requirements, if any, and limits of liability for insurance required in Article 11 of AIA Document A201-2007.)*

Type of insurance or bond	Limit of liability or bond amount (\$0.00)
Performance Bond	Equal to Contract Amount
Payment Bond	Equal to Contract Amount

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

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

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

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

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





# AIA<sup>®</sup> Document A201<sup>™</sup> – 2007

## General Conditions of the Contract for Construction

for the following PROJECT:

*(Name and location or address)*

### THE OWNER:

*(Name, legal status and address)*

### THE ARCHITECT:

*(Name, legal status and address)*

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## **ARTICLE 1 GENERAL PROVISIONS**

### **§ 1.1 BASIC DEFINITIONS**

#### **§ 1.1.1 THE CONTRACT DOCUMENTS**

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

#### **§ 1.1.2 THE CONTRACT**

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

#### **§ 1.1.3 THE WORK**

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

#### **§ 1.1.4 THE PROJECT**

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

#### **§ 1.1.5 THE DRAWINGS**

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

#### **§ 1.1.6 THE SPECIFICATIONS**

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

#### **§ 1.1.7 INSTRUMENTS OF SERVICE**

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

#### **§ 1.1.8 INITIAL DECISION MAKER**

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

### **§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS**

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

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

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

### **§ 1.3 CAPITALIZATION**

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

### **§ 1.4 INTERPRETATION**

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

### **§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE**

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

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

### **§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM**

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

## **ARTICLE 2 OWNER**

### **§ 2.1 GENERAL**

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

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

### **§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER**

**§ 2.2.1** Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner’s obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner’s ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or

the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

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

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

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

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

### **§ 2.3 OWNER'S RIGHT TO STOP THE WORK**

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

### **§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK**

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of 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 the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

## **ARTICLE 3 CONTRACTOR**

### **§ 3.1 GENERAL**

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

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

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

### **§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR**

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

**§ 3.2.2** Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

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

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

### **§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES**

**§ 3.3.1** The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

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

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

### **§ 3.4 LABOR AND MATERIALS**

**§ 3.4.1** Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other



facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

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

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

### **§ 3.5 WARRANTY**

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

### **§ 3.6 TAXES**

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

### **§ 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS**

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

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

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

**§ 3.7.4 Concealed or Unknown Conditions.** If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15.

**§ 3.7.5** If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume

the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

### **§ 3.8 ALLOWANCES**

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

**§ 3.8.2** Unless otherwise provided in the Contract Documents,

- .1 Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

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

### **§ 3.9 SUPERINTENDENT**

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

**§ 3.9.2** The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed superintendent. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed superintendent or (2) that the Architect requires additional time to review. Failure of the Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

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

### **§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES**

**§ 3.10.1** 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. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

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

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

### § 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

### § 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

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

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

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

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

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

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

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

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

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

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

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required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

### **§ 3.13 USE OF SITE**

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

### **§ 3.14 CUTTING AND PATCHING**

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

**§ 3.14.2** The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

### **§ 3.15 CLEANING UP**

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

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

### **§ 3.16 ACCESS TO WORK**

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

### **§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS**

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

### **§ 3.18 INDEMNIFICATION**

**§ 3.18.1** To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

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

## **ARTICLE 4 ARCHITECT**

### **§ 4.1 GENERAL**

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

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

**§ 4.1.3** If the employment of the Architect is terminated, the Owner shall employ a successor architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

### **§ 4.2 ADMINISTRATION OF THE CONTRACT**

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

**§ 4.2.2** The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

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

#### § 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

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

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

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

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

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

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

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

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

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

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

## **ARTICLE 5 SUBCONTRACTORS**

### **§ 5.1 DEFINITIONS**

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

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

### **§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK**

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

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

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

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

### **§ 5.3 SUBCONTRACTUAL RELATIONS**

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



be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

#### **§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS**

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

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

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

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

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

### **ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS**

#### **§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS**

**§ 6.1.1** The 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 or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

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

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

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

#### **§ 6.2 MUTUAL RESPONSIBILITY**

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

**§ 6.2.2** If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that



the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

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

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

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

### **§ 6.3 OWNER'S RIGHT TO CLEAN UP**

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

## **ARTICLE 7 CHANGES IN THE WORK**

### **§ 7.1 GENERAL**

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

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

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

### **§ 7.2 CHANGE ORDERS**

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

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

### **§ 7.3 CONSTRUCTION CHANGE DIRECTIVES**

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

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

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

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

.4 As provided in Section 7.3.7.

**§ 7.3.4** If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

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

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

**§ 7.3.7** If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

1. Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
2. Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
3. Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
4. Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
5. Additional costs of supervision and field office personnel directly attributable to the change.

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

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

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

#### **§ 7.4 MINOR CHANGES IN THE WORK**

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor.

## **ARTICLE 8 TIME**

### **§ 8.1 DEFINITIONS**

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

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

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

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

### **§ 8.2 PROGRESS AND COMPLETION**

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

**§ 8.2.2** The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

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

### **§ 8.3 DELAYS AND EXTENSIONS OF TIME**

**§ 8.3.1** If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or 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; or by delay authorized by the Owner pending mediation and arbitration; or by other causes that the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

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

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

## **ARTICLE 9 PAYMENTS AND COMPLETION**

### **§ 9.1 CONTRACT SUM**

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

### **§ 9.2 SCHEDULE OF VALUES**

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

### **§ 9.3 APPLICATIONS FOR PAYMENT**

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

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

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

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

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

#### **§ 9.4 CERTIFICATES FOR PAYMENT**

**§ 9.4.1** The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

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

#### **§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION**

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

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;

- .3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a separate contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

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

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

## § 9.6 PROGRESS PAYMENTS

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

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

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

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

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

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

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

## § 9.7 FAILURE OF PAYMENT

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

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appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

#### **§ 9.8 SUBSTANTIAL COMPLETION**

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

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

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

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

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

#### **§ 9.9 PARTIAL OCCUPANCY OR USE**

**§ 9.9.1** The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

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

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

#### **§ 9.10 FINAL COMPLETION AND FINAL PAYMENT**

**§ 9.10.1** Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect

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will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

**§ 9.10.2** Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

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

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

- .1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents; or
- .3 terms of special warranties required by the Contract Documents.

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

## **ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY**

### **§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS**

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

### **§ 10.2 SAFETY OF PERSONS AND PROPERTY**

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

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.



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

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

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

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

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

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

#### § 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY

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

#### § 10.3 HAZARDOUS MATERIALS

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

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.



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

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

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

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

#### § 10.4 EMERGENCIES

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

### ARTICLE 11 INSURANCE AND BONDS

#### § 11.1 CONTRACTOR'S LIABILITY INSURANCE

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

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 Claims for damages insured by usual personal injury liability coverage;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction

of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

#### § 11.2 OWNER'S LIABILITY INSURANCE

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

#### § 11.3 PROPERTY INSURANCE

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

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

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

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

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

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or

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otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

#### **§ 11.3.2 BOILER AND MACHINERY INSURANCE**

The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

#### **§ 11.3.3 LOSS OF USE INSURANCE**

The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

**§ 11.3.4** If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

**§ 11.3.5** If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

**§ 11.3.6** Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

#### **§ 11.3.7 WAIVERS OF SUBROGATION**

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

**§ 11.3.8** A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

**§ 11.3.9** If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the

Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

**§ 11.3.10** The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.

#### **§ 11.4 PERFORMANCE BOND AND PAYMENT BOND**

**§ 11.4.1** The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

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

### **ARTICLE 12 UNCOVERING AND CORRECTION OF WORK**

#### **§ 12.1 UNCOVERING OF WORK**

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

**§ 12.1.2** If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

#### **§ 12.2 CORRECTION OF WORK**

##### **§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION**

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

##### **§ 12.2.2 AFTER SUBSTANTIAL COMPLETION**

**§ 12.2.2.1** In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

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

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

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

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

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

### § 12.3 ACCEPTANCE OF NONCONFORMING WORK

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

## ARTICLE 13 MISCELLANEOUS PROVISIONS

### § 13.1 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

### § 13.2 SUCCESSORS AND ASSIGNS

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

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

### § 13.3 WRITTEN NOTICE

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

### § 13.4 RIGHTS AND REMEDIES

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

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

### **§ 13.5 TESTS AND INSPECTIONS**

**§ 13.5.1** Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

**§ 13.5.2** If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

**§ 13.5.3** If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

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

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

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

### **§ 13.6 INTEREST**

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

### **§ 13.7 TIME LIMITS ON CLAIMS**

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

## **ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT**

### **§ 14.1 TERMINATION BY THE CONTRACTOR**

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

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;

- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

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

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

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

## § 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors 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 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner, upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, 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, subject to any prior rights of the surety:

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

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

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

## § 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

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



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

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

#### § 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

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

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

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

§ 14.4.3 In case of such termination for the Owner's convenience, 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 15 CLAIMS AND DISPUTES

#### § 15.1 CLAIMS

##### § 15.1.1 DEFINITION

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

##### § 15.1.2 NOTICE OF CLAIMS

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

##### § 15.1.3 CONTINUING CONTRACT PERFORMANCE

Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

##### § 15.1.4 CLAIMS FOR ADDITIONAL COST

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

##### § 15.1.5 CLAIMS FOR ADDITIONAL TIME

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

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



#### **§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES**

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

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

#### **§ 15.2 INITIAL DECISION**

**§ 15.2.1** Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

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

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

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

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

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

**§ 15.2.6.1** Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

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

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

### § 15.3 MEDIATION

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

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

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

### § 15.4 ARBITRATION

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

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

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

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

### § 15.4.4 CONSOLIDATION OR JOINDER

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

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an

additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

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



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# SUPPLEMENTARY GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

THESE SUPPLEMENTARY GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION CONTAIN CHANGES AND ADDITIONS TO AIA DOCUMENT A201, CROSS REFERENCED TO THE ORIGINAL ARTICLE NUMBERS IN AIA DOCUMENT A201. WHERE ANY PART OF AIA DOCUMENT A201 IS NOT MODIFIED OR VOIDED BY THESE SUPPLEMENTARY GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, THE UNALTERED PART REMAINS IN EFFECT.

## ARTICLE 1

### GENERAL PROVISIONS

#### PARAGRAPH 1.2: ADD THE FOLLOWING SUBPARAGRAPH:

1.2.4 Omissions from the drawings or specifications or the misdescription of details of work which are manifestly necessary to carry out the intent of the drawings and specifications, or which are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details of the work but they shall be performed as if fully and correctly set forth and described in the drawings and specifications.

## ARTICLE 3

### CONTRACTOR

#### PARAGRAPH 3.1: ADD THE FOLLOWING SUBPARAGRAPH:

3.1.4 If the Contractor hereunder is comprised of more than one legal entity, each entity shall be jointly and severally liable hereunder.

#### SUBPARAGRAPH 3.3.1: MODIFY CONTENT BY CHANGING IT TO READ AS FOLLOWS:

3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such construction means, methods, techniques, sequences or procedures. If the Contractor determines that such construction means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further

written instructions from the Architect, as approved by the Owner. If the Contractor is then instructed to proceed with the required construction means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any resulting loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

#### PARAGRAPH 3.4: ADD THE FOLLOWING SUBPARAGRAPHS:

3.4.4 Except where a preference or discrimination is prohibited elsewhere in these Contract Documents, in connection with the performance of work under this Contract, the Contractor must give preference to the employment of bona fide North Dakota residents, as determined by NDCC 54-01-26, with preference given first to honorably discharged disabled veterans and veterans of the armed forces of the United States, as defined in NDCC 37-19.1-01, who are deemed to be qualified in the performance of said work.

3.4.5 Price and quality being equal or better, the Contractor must purchase materials manufactured or produced in the state of North Dakota, or materials manufactured or produced in part in North Dakota, for use on this project.

#### PARAGRAPH 3.5: ADD THE FOLLOWING SUBPARAGRAPHS:

3.5.1 The Contractor shall furnish to the Architect, when requested, material certifications on manufactured items to be used on this project.

3.5.2 The Contractor shall guarantee and maintain the stability of all work and materials and keep same in perfect repair and condition for the period of one (1) year from the date of final acceptance of the Work, but with respect to any part of the Work which the Owner takes possession of prior to final acceptance, such guarantee shall continue for a period of one year from the date the Owner takes possession.

3.5.3 Defects of any kind, due to faulty work or materials appearing during the above-mentioned period must be immediately made good by the Contractor at the Contractor's own expense to the entire satisfaction of the Owner and Architect. Such construction and repairs shall include the costs of all damages to the finish or furnishings

of the building resulting from the original defect or repairs thereto. Where equipment is required to be replaced, the one-year warranty shall be reinstated for that piece of equipment from date of replacement.

3.5.4 The guarantee shall not apply to injuries or damages occurring after final acceptance due to "acts of God," fire, violence, abuse or carelessness of other Contractors or agents of the Owner; however, the Owner reserves the right to make temporary repairs as necessary to keep equipment in operating condition without voiding the Contractor's guarantee nor relieving the Contractor of any responsibilities during the guarantee period.

3.5.5 This guarantee shall be extended where other guarantees for different lengths of time are specifically called for in the Contract Documents or where manufacturer's standard warranties extend for a longer period.

**SUBPARAGRAPH 3.7.2: MODIFY CONTENT BY CHANGING IT TO READ AS FOLLOWS:**

3.7.2 The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations, and lawful orders of public authorities applicable to performance of the Work. Where the Contract Documents require Work better than that required by statute, the Contract Documents shall govern.

**PARAGRAPH 3.10: DELETE IN ITS ENTIRETY AND SUBSTITUTE THE FOLLOWING:**

**3.10 CONTRACTOR'S CONSTRUCTION SCHEDULE**

3.10.1 The Contractor shall, within ten days after Contract award or another period of time determined by the Owner and Architect, prepare and submit to the Architect for approval, three copies of a practicable schedule showing by written description, the order in which the Contractor proposes to perform the Work, and the dates on which the Contractor contemplates starting and completing the several salient features of the Work (including acquiring materials, plant, and equipment). The schedule shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of Work scheduled for completion by any given date during the period.

3.10.2 The schedule shall not exceed the time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project or by the Architect, shall be related to the entire Project to the extent required by the Contract Documents, shall provide for expeditious and practicable execution of the Work and shall allow the Architect reasonable time to review all required submittals.

3.10.3 If the Contractor fails to submit or resubmit an approved schedule within the time prescribed, the Architect may withhold approval of progress payments until the Contractor submits the required schedule.

3.10.4 During construction, the Contractor shall enter the actual progress on the chart as directed by the Architect. If, in the opinion of the Architect, the Contractor falls behind the approved schedule, the Contractor shall take steps necessary to improve progress, including those that may be required by the Architect, without additional cost to the State. In this circumstance, the Architect may require the Contractor to increase the number of shifts, overtime operations, days of work, and/or the amount of construction plant, and to submit for approval any supplementary schedule or schedules in chart form as the Architect deems necessary to demonstrate how the approved rate of progress will be regained.

3.10.5 Failure of the Contractor to comply with the requirements of the Architect under this clause shall be grounds for a determination by the Owner and Architect that the Contractor is not prosecuting the Work with sufficient diligence to ensure completion within the time specified in the Contract. Upon making this determination, the Owner may terminate the Contractor's right to proceed with the Work, or any separable part of it, in accordance with the termination for cause terms of this Contract.

**SUBPARAGRAPH 3.12.5: MODIFY CONTENT BY CHANGING IT TO READ AS FOLLOWS:**

3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors. Submittals which are not marked as reviewed for compliance with the Contract Documents and approved by the Contractor may be returned by the Architect without action.

**PARAGRAPH 3.12: ADD THE FOLLOWING SUBPARAGRAPH:**

3.12.11 The Architect and Owner may duplicate, use and disclose, in any manner and for any purpose, shop drawings delivered under this Contract and all subcontracts hereunder at any tier.

**PARAGRAPH 3.13: DELETE SUBPARAGRAPH 3.13.1 IN ITS ENTIRETY AND SUBSTITUTE THE FOLLOWING:**

3.13.1 The Contractor shall confine operations (including storage of materials) at the site to areas permitted by law, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents as approved by the Architect and Owner, and shall not unreasonably encumber the site with materials or equipment.

3.13.2 The Contractor shall at all times so conduct the Work as to ensure the least possible obstruction to traffic and inconvenience to the general public and the residents in

the vicinity of the Work, and to ensure the protection of persons and property. No road or street shall be closed to the public except with the permission of the proper authorities. Fire hydrants on or adjacent to the Work shall be kept accessible to fire fighting equipment at all times. Temporary provisions shall be made by the Contractor to ensure the use of sidewalks and the proper functioning of all gutters, sewer inlets, drainage ditches, irrigation ditches, etc., which shall not be obstructed.

**PARAGRAPH 3.16: MODIFY CONTENT BY CHANGING IT TO READ AS FOLLOWS:**

**3.16 ACCESS TO WORK**

The Contractor shall provide the Owner and Architect and authorized representatives of the State and Federal Governments access to the Work in preparation and progress wherever located. The Contractor shall furnish without additional charges, all reasonable facilities necessary for safe and convenient inspections.

**SUBPARAGRAPH 3.18.1: DELETE IN ITS ENTIRETY AND SUBSTITUTE THE FOLLOWING:**

**3.18 INDEMNIFICATION**

3.18.1 The Contractor shall defend, indemnify, and hold harmless the Owner (i.e. The Adjutant General, State of North Dakota), its agents, officers and employees, from and against claims based on the vicarious liability of the Contractor or its agent, but not against claims based on the Owner's contributory negligence, comparative and/or contributory negligence or fault, sole negligence, or intentional misconduct. The legal defense provided by the Contractor to the Owner under this provision must be free of any conflicts of interest, even if retention of separate legal counsel for the Owner is necessary. The Contractor also agrees to defend, indemnify, and hold the Owner harmless for all costs, expenses and attorneys' fees incurred if the Owner prevails in an action against the Contractor in establishing and litigating the indemnification coverage provided herein. This obligation shall continue after the termination of this Contract.

## **ARTICLE 4**

### **ARCHITECT**

**SUBPARAGRAPH 4.1.1: DELETE IN ITS ENTIRETY AND SUBSTITUTE THE FOLLOWING:**

4.1.1 The term "Architect," throughout these Contract Documents, refers to the person or entity lawfully engaged in the practice of architecture or engineering and who is identified as the Architect or Engineer on page one of the Standard Form of Agreement Between Owner and Contractor (AIA Document A101).

**SUBPARAGRAPH 4.2.1: MODIFY CONTENT BY CHANGING IT TO READ AS FOLLOWS:**

4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative (1) during construction, (2) until the date the Architect issues the final Certificate for Payment, and (3) and from time to time during the one-year period for correction of Work as described in 12.2. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

## **ARTICLE 5**

### **SUBCONTRACTORS**

**PARAGRAPH 5.2: DELETE THE FOLLOWING SUBPARAGRAPHS IN THEIR ENTIRETY AND SUBSTITUTE THE FOLLOWING:**

5.2.2 The Contractor shall not contract with any person or entity declared ineligible under Federal laws or regulations from participating in Federally assisted construction projects or to whom the Owner or the Architect has made reasonable objection under the provisions of Subparagraph 5.2.1. The Contractor shall not be required to contract with anyone to whom the Contractor has a reasonable objection.

5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity previously selected and to whom the Owner and Architect have made no reasonable objection except with the written consent of the Owner and Architect.

**PARAGRAPH 5.3: ADD THE FOLLOWING SUBPARAGRAPHS:**

5.3.1 Prior to employment on the job site, each Subcontractor and Sub-subcontractor must acknowledge that the terms and conditions of the Contract Documents are incorporated into and made a part of their subcontract. Subcontractor Statement and Acknowledgment, AGND Document 435S, will be utilized for this purpose.

5.3.2 Notwithstanding all other provisions of the contract documents, all claims for any work or improvement made by subcontractors, sub-subcontractors, and suppliers of material and/or equipment shall be governed by the provisions of sections 48-01.2-11 and 48-01.2-12 of the North Dakota Century Code.

5.3.3 In the absence of a written agreement between the Contractor and subcontractors concerning the resolution of disputes, disputes shall be submitted to arbitration pursuant to Chapter 32-29.3, N.D.C.C.

## ARTICLE 7

### CHANGES IN THE WORK

#### **PARAGRAPH 7.1: ADD THE FOLLOWING SUBPARAGRAPH:**

7.1.4 Neither the Owner nor the Architect is responsible to give notice of Change Orders, Construction Change Directives, and/or orders for minor changes in the Work to the surety (if any).

#### **PARAGRAPH 7.2: ADD THE FOLLOWING SUBPARAGRAPHS:**

7.2.2 The Contractor, in connection with any proposal for a Change Order, shall furnish a price breakdown, itemized as required in Subparagraph 7.2.3 below. Unless otherwise directed, the breakdown shall be in sufficient detail to permit an analysis of all materials, labor, equipment, subcontract, and overhead costs, as well as profit, and shall cover all work involved in the change proposal, whether such work was deleted, added, or changed. Any amount claimed for subcontracts shall be supported by a similar price breakdown. In addition, if the change proposal includes a time extension, a justification therefor, shall also be furnished. The proposal, together with the price breakdown and time extension justification, shall be furnished by the date specified by the Owner.

7.2.3 Costs for proposals to perform changes in the Work consisting of additions, deletions, or other revisions shall be limited to the following:

- .1 Actual labor costs involved to include fringe benefits required by agreement or custom plus twenty-five (25%) for all labor overhead factors which include job superintendent salary and subsistence
- .2 Actual costs of materials, supplies, and equipment including all transportation costs and applicable taxes
- .3 Actual rental costs of machinery and equipment, exclusive of hand tools
- .4 Fifteen percent (15%) of direct labor, material, supplies, equipment, and rental gross amounts and ten percent (10%) of subcontracts for all overhead and profit factors, which includes all insurance costs.
- .5 One percent (1%) for all bond premium adjustments unless actual costs are greater as evidenced by invoices or other data
- .6 Credits are to be calculated in a similar manner, including overhead and profits on subcontracts (10%), but not on labor and materials (15%), except that when both additions and credits covering related Work or substitutions are involved in a change proposal, the allowance for overhead and profit (15%) shall be figured on the basis of net increase, if any, with respect to that change proposal.

7.2.4 If a Change Order is written and the new total contract amount is more than \$25,000, then the Contractor must furnish Data Universal Numbering Systems (DUNS)

number to be in compliance with the Federal Funding Accountability and Transparency Act of 2006.

#### **SUBPARAGRAPH 7.3.3 ADD THE FOLLOWING SUBPARAGRAPH:**

7.3.3.5 By the method provided in subparagraph 7.2.3. This method will be utilized exclusively for all construction change directives unless other above listed methods are specifically authorized by Owner.

#### **SUBPARAGRAPH 7.3.9: MODIFY CONTENT BY CHANGING IT TO READ AS FOLLOWS:**

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

## ARTICLE 8

### TIME

#### **ARTICLE 8: ADD THE FOLLOWING PARAGRAPH:**

#### **8.4 NOTICE TO THE OWNER OF LABOR DISPUTES**

8.4.1 If the Contractor has knowledge that any actual or potential labor dispute is delaying or threatens to delay the timely performance of this Contract, the Contractor shall immediately give notice, including all relevant information, to the Owner.

8.4.2 The Contractor agrees to insert the substance of this clause, including this paragraph 8.4.2, in any subcontract to which a labor dispute may delay the timely performance of this Contract, except that each subcontract shall provide that in the event its timely performance is delayed or threatened by delay by any actual or potential labor dispute, the subcontractor shall immediately notify the next higher tier subcontractor or the prime Contractor, as the case may be, of all relevant information concerning the dispute.

## ARTICLE 9

### PAYMENTS AND COMPLETION

#### **SUBPARAGRAPH 9.3.1**

#### **SUBPARAGRAPH 9.3.1.1: MODIFY CONTENT BY CHANGING IT TO READ AS FOLLOWS:**

9.3.1.1 As provided in Subparagraph 7.3.9 (as revised by these Supplementary General Conditions), such applications may include requests for payment on account of changes in the Work which have been properly authorized by Construction Change Directives and which are accompanied



by a Change Order indicating the parties' agreement with costs associated with such Work.

**ADD THE FOLLOWING SUBPARAGRAPHS:**

9.3.1.3 Contractor shall submit Application for Payment to Architect in two copies, both with original signatures, to include notarization of Contractor's signature. Said application for payment shall be written on AIA Document G702, Application and Certificate for Payment, copies of which shall be furnished by the Owner.

9.3.1.4 If required by Architect, Contractor shall furnish with each Application for Payment lien waivers from specified subcontractors and suppliers for labor and materials approved for progress payment under previous application.

9.3.1.5 Applications for payment shall reflect a retainage equal to 10% of Contractor's Application for Payment until such time as Contract is 50% completed. When 95% complete, up to 95% of the amount retained from previous estimates may be paid at the discretion of the Architect. Final payment of all moneys due the Contractor shall be made immediately following completion and acceptance of the project as provided in paragraph 9.10.

**SUBPARAGRAPH 9.5.3: DELETE IN ITS ENTIRETY.**

**SUBPARAGRAPH 9.6.1: MODIFY CONTENT BY CHANGING IT TO READ AS FOLLOWS:**

9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect. The Owner shall have thirty days AFTER receipt of Certificate for Payment from Architect for administrative processing and issuance of payment. No contractor payment shall become due and/or unpaid prior to the expiration of said thirty day period.

**PARAGRAPH 9.10.2: MODIFY CONTENT BY CHANGING IT TO READ AS FOLLOWS:**

9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or

encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

**PARAGRAPH 9.10: ADD THE FOLLOWING SUBPARAGRAPH:**

9.10.6 Items specifically required by Owner to be submitted by Contractor prior to final payment as per Subparagraph 9.10.2 as a minimum, are enumerated as follows:

- .1 Contractor's Affidavit of Payment of Debts and Claims, conditioned that the Contractor has satisfied all obligations for all materials and equipment furnished and all work, labor, and services performed in connection with the performance of this Contract, and further, that the Contractor will indemnify the Owner against all liability for any and all claims, judgments, and costs brought or obtained by subcontractors, all suppliers of materials and equipment, and all performers of work, labor, or services arising in any manner out of the performance of the Contract.
- .2 Consent of Surety to Final Payment (if performance/payment bonds were required).
- .3 Contractor's Release or Waiver of Liens.
- .4 Current Statement of ND Tax Commissioner relating to income tax and sales tax clearance.
- .5 Current Certificate of Premium Payment to North Dakota Workforce Safety and Insurance.

## **ARTICLE 10**

### **PROTECTION OF PERSONS AND PROPERTY**

**PARAGRAPH 10.1: ADD THE FOLLOWING SUBPARAGRAPHS:**

10.1.1 When required by the Owner, the Contractor shall submit to the Owner a copy of the written safety program to be used as guidelines and direction for the Contractor's and subcontractors' activities. This program must meet all federal, state, and local laws, regulations, and other legal requirements and shall include the following minimum provisions:

- .1 a worksite safety policy and mission statement.
- .2 assigned responsibilities among management, supervisors, and employees.
- .3 a system for periodic self-inspections, including inspections of job sites, materials, work performance, and equipment.

.4 a thorough accident and injury reporting and investigation process.

.5 a safety orientation program including first aid, medical attention, emergency facilities, fire protection and prevention, housekeeping, illumination, sanitation, personal protective equipment, and occupational noise exposure.

.6 a safety training program including safety "tool box" meetings and other systems for ongoing training and also including training for employees on the recognition, avoidance, and prevention of unsafe conditions.

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

**PARAGRAPH 10.3: ADD THE FOLLOWING SUBPARAGRAPH:**

10.3.7 No material, supplies, or equipment shall be furnished or installed by the Contractor for this Project which contains hazardous materials. This includes but is not necessarily limited to asbestos and polychlorinated biphenyl (PCB).

**SUBPARAGRAPH 10.3.3: DELETE IN ITS ENTIRETY.**

## **ARTICLE 11**

### **INSURANCE AND BONDS**

**SUBPARAGRAPH 11.1.2: MODIFY CONTENT BY CHANGING IT TO READ AS FOLLOWS:**

11.1.2 The insurance required by Subparagraph 11.1.1 and Article 16 of these Supplementary General Conditions of the Contract for Construction shall be written for not less than the limits of liability specified in said Article 16 or required by law, whichever coverage is greater. Neither the Owner nor the Architect shall be responsible in the event limits are insufficient. Coverages shall be written on an occurrence basis, and shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment. Products and completed operations coverage will be maintained for a period of one year after final payment unless longer warranty period is specified.

**SUBPARAGRAPHS 11.1.3 AND 11.1.4: DELETE IN THEIR ENTIRETY AND SUBSTITUTE THE FOLLOWING:**

11.1.3 The insurance required by Subparagraph 11.1.1 and Article 16 of these Supplementary General Conditions of the contract for Construction must meet the following additional requirements:

- .1 Any deductible or self insured retention amount or other similar obligation under the policies shall be the sole responsibility of the Contractor. The amount of any deductible or self retention is subject to approval by the Owner.
- .2 This insurance may be in policy or policies of insurance, primary and excess, including the so-called umbrella or catastrophe form and must be placed with insurers rated "A-" or better by A.M. Best Company, Inc., provided any excess policy follows form for coverage. Less than an "A-" rating must be approved by the Owner. The policies shall be in form and terms approved by the Owner.
- .3 The duty to defend, indemnify, and hold harmless the Owner under this Contract shall not be limited by the insurance required in this agreement.
- .4 The Owner (The Adjutant General, State of North Dakota) and its agents, officers, and employees shall be endorsed on the commercial general liability policy, including any excess policies (to the extent applicable), as additional insured. The Owner shall have all the benefits, rights, and coverages of an additional insured under said policies.
- .5 The insurance required in this agreement, through a policy or endorsement, shall include:
  - a "Waiver of Subrogation" waiving any right to recovery the insurance company may have against the Owner;
  - a provision that any attorney who represents the Owner under this policy must first qualify as and be appointed by the North Dakota Attorney General as a Special Assistant Attorney General as required under N.D.C.C. § 54-12-08;
  - a provision that Contractor's insurance coverage shall be primary (i.e., pay first) as respects any insurance, self-insurance or self-retention maintained by the Owner and that any insurance, self-insurance or self-retention maintained by the Owner shall be in excess of the Contractor's insurance and shall not contribute with it;
  - cross liability/severability of interest for all policies and endorsements;
  - the legal defense provided to the Owner under the policy and any endorsements must be free of any conflicts of interest, even if retention of separate legal counsel for the Owner is necessary.
  - the insolvency or bankruptcy of the insured Contractor shall not release the insurer from payment under the policy, even when such insolvency or bankruptcy prevents the insured Contractor from meeting the retention limit under the policy.
- .6 The Contractor shall provide written notification to the Owner of the cancellation or expiration of any insurance

required by Section 11.1. The Contractor shall provide such written notice within five (5) business days of the date the Contractor is first aware of the cancellation or expiration, or is first aware that the cancellation or expiration is threatened or otherwise may occur, whichever comes first.

- .7 The Contractor shall furnish a certificate of insurance to the Owner prior to commencement of the Work. All endorsements shall be provided as soon as practicable.
- .8 Failure to provide insurance as required herein is a material breach of contract entitling Owner to immediately terminate this agreement.

**PARAGRAPH 11.2: DELETE IN ITS ENTIRETY.**

**SUBPARAGRAPH 11.3.1: MODIFY CONTENT BY CHANGING IT TO READ AS FOLLOWS:**

11.3.1 If required in Article 16, the Contractor shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. This property insurance shall in no case be less than that specified in Article 16 of these Supplementary General Conditions of the Contract for Construction. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Paragraph 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Paragraph 11.4 to be covered, whichever is later. The Owner (The Adjutant General, State of North Dakota) and all Contractors, Subcontractors and Sub-subcontractors in the Project shall be endorsed on this policy as additional insureds.

**SUBPARAGRAPH 11.3.1.2: DELETE IN ITS ENTIRETY.**

**SUBPARAGRAPH 11.3.1.3: DELETE IN ITS ENTIRETY AND SUBSTITUTE THE FOLLOWING:**

11.3.1.3 A property insurance deductible is allowed as identified in Article 16 of these Supplementary General Conditions of the Contract for Construction. The Contractor purchasing and maintaining this insurance shall pay all costs not covered because of such deductible, except that each and every Contractor (prime, subcontractor, sub-subcontractor,

etc.) who sustains a loss shall be responsible for said deductible as pertains to materials and/or equipment stored off the site or in transit. Once materials and/or equipment are on site or have been installed and are a permanent part of the building itself, all losses shall be the responsibility of the Contractor furnishing the property insurance.

**SUBPARAGRAPH 11.3.1.4: MODIFY CONTENT BY CHANGING IT TO READ AS FOLLOWS:**

11.3.1.4 Unless otherwise provided in the Contract Documents, this property insurance shall cover portions of the Work stored off the site and portions of the Work in transit in the limits specified in Article 16 of these General Supplementary Conditions of the Contract for Construction.

**SUBPARAGRAPHS 11.3.2, 11.3.4 AND 11.3.5: DELETE IN THEIR ENTIRETY.**

**SUBPARAGRAPH 11.3.6: MODIFY CONTENT BY CHANGING IT TO READ AS FOLLOWS:**

11.3.6 Before an exposure to loss may occur, the Contractor shall file with the Owner the original policy or a certified copy thereof that includes insurance coverages required by the Paragraph 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. The Contractor shall provide written notification to the Owner of the cancellation or expiration of any insurance required by Section 11.3. The Contractor shall provide such written notice within five (5) business days of the date the Contractor is first aware of the cancellation or expiration, or is first aware that the cancellation or expiration is threatened or otherwise may occur, whichever comes first.

**SUBPARAGRAPHS 11.3.7, 11.3.8, AND 11.3.9: MODIFY CONTENT BY CHANGING AS FOLLOWS:**

All references in above listed paragraphs that refer to Owner's duties/responsibilities, Owner's property insurance, Owner as "fiduciary", etc., shall be changed to mean Contractor's duties/responsibilities, Contractor's property insurance, Contractor as "fiduciary", etc. The Contractor referred to in these paragraphs is that Contractor responsible for purchasing and maintaining the property insurance.

**SUBPARAGRAPH 11.3.10: MODIFY CONTENT BY CHANGING IT TO READ AS FOLLOWS**

11.3.10 The Contractor as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Contractor's exercise of this power; if such objection is made, the dispute shall be resolved as provided in Article 15.

## ARTICLE 12

### UNCOVERING AND CORRECTION OF WORK

#### **SUBPARAGRAPH 12.2.2.1: MODIFY CONTENT BY CHANGING IT TO READ AS FOLLOWS:**

12.2.2.1 In addition to the Contractor's obligations under Paragraph 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Subparagraph 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Paragraph 2.4.

#### **SUBPARAGRAPH 12.2.2.3: DELETE IN ITS ENTIRETY.**

## ARTICLE 13

### MISCELLANEOUS PROVISIONS

#### **PARAGRAPH 13.1: DELETE IN ITS ENTIRETY AND SUBSTITUTE THE FOLLOWING:**

##### **13.1 GOVERNING LAW**

This Contract is governed by the laws of the State of North Dakota. Any action to enforce this Contract must be brought in the District Court of Burleigh County, North Dakota.

#### **PARAGRAPH 13.6: DELETE IN ITS ENTIRETY AND SUBSTITUTE THE FOLLOWING:**

##### **13.6 INTEREST**

13.6.1 Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate per annum of two percentage points below the Bank of North Dakota prime interest rate as set thirty days from the date payment is due until the issuance of proper payment therefor.

#### **ADD THE FOLLOWING PARAGRAPHS:**

### 13.8 MAINTENANCE OF RECORDS BY CONTRACTOR

13.8.1 The Contractor shall maintain all directly pertinent books, documents, papers, and other records involving transactions related to this Contract for three years after the Owner makes final payment and all other pending matters are closed.

### 13.9 NONDISCRIMINATION IN EMPLOYMENT

13.9.1 In connection with the performance of work under this Contract, the Contractor will not discriminate against any employee or applicant for employment because of sex, race, creed, color, or national origin; and will insert the foregoing provision in all subcontracts hereunder except subcontracts for standard commercial supplies or for raw materials.

### 13.10 LIQUIDATED DAMAGES

13.10.1 The parties agree that damages for non-performance by the Contractor would be difficult to estimate at the time of entering this contract. If the Contractor fails to complete the Work within the time specified in the Contract, or any extension, the Contractor shall pay to the Owner as liquidated damages the amount of \$100.00 for each day of delay, plus any costs incurred by the Owner for legal review and Contract modification.

13.10.2 If the Owner terminates the Contractor's right to proceed, the resulting damage will consist of liquidated damages until such reasonable time as may be required for final completion of the work together with any increased costs occasioned the Owner in completing the Work.

13.10.3 If the Owner does not terminate the Contractor's right to proceed, the resulting damage will consist of liquidated damages until the Work is completed or accepted.

## ARTICLE 14

### TERMINATION OR SUSPENSION OF THE CONTRACT

#### **SUBPARAGRAPH 14.1.2: DELETE IN ITS ENTIRETY**

#### **SUBPARAGRAPH 14.1.3: MODIFY CONTENT BY CHANGING IT TO READ AS FOLLOWS**

14.1.3 If one of the reasons described in Section 14.1.1 exists, the Contractor may, upon seven 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.

**PARAGRAPH 14.3: DELETE IN ITS ENTIRETY AND SUBSTITUTE THE FOLLOWING:**

**14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE**

14.3.1 The Owner may order the Contractor, in writing, to suspend, delay, or interrupt all or any part of the Work of this Contract for the period of time that the Owner determines appropriate for the convenience of the State.

14.3.2 If the performance of all or any part of the Work is, for an unreasonable period of time, suspended, delayed, or interrupted (1) by an act of the Owner in the administration of this Contract, or (2) by the Owner's failure to act within the time specified in this Contract (or within a reasonable time if not specified), an adjustment shall be made for any increase in the cost of performance of this Contract (excluding profit) necessarily caused by the unreasonable suspension, delay, or interruption, and the Contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor, or for which an equitable adjustment is provided for or excluded under any other term or condition of this Contract.

14.3.3 A claim under this clause shall not be allowed:

- .1 for any costs incurred more than 21 days before the Contractor shall have notified the Owner in writing of the act or failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension order), and
- .2 unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of the suspension, delay, or interruption, but not later than the date of final payment under the Contract.

**PARAGRAPH 14.4: DELETE IN ITS ENTIRETY AND SUBSTITUTE THE FOLLOWING:**

**14.4 TERMINATION BY THE OWNER FOR CONVENIENCE**

14.4.1 The Owner, by written notice, may terminate this Contract, in whole or in part, when it is in the best interest of the State. If this Contract is so terminated, the Owner shall be liable only for payment in accordance with the payment provisions of this Contract for Work executed prior to the effective date of termination, and costs incurred by reason of such termination.

**ADD THE FOLLOWING PARAGRAPH:**

**14.5 TERMINATION BY THE OWNER FOR LACK OF FUNDING OR AUTHORITY**

14.5.1 The Owner, by written notice, may terminate this Contract under any of the following conditions:

- .1 If funding from federal, state, or other sources is not available at levels sufficient to allow for the continuation of the Work.

.2 If federal or state laws or rules are modified or interpreted in a way that the Work under this contract is no longer eligible for the funding proposed for payments authorized by this contract.

.3 If any license, permit or certificate required by law or rule, or by the terms of this contract, is for any reason denied, revoked, suspended or not renewed.

14.5.2 If this Contract is so terminated, the Owner shall be liable only for payment in accordance with the payment provisions of this Contract for Work executed prior to the effective date of termination, and costs incurred by reason of such termination.

## **ARTICLE 15**

### **CLAIMS AND DISPUTES**

**SUBPARAGRAPHS 15.2.5 AND 15.2.6: DELETE IN THEIR ENTIRETY AND SUBSTITUTE THE FOLLOWING:**

15.2.5 The Initial Decision Maker will approve or reject Claims by written decision, which shall state the reasons therefor and which shall notify the parties of any change in the Contract Sum or Contract Time or both. The approval or rejection of a Claim by the Initial Decision Maker shall be final and binding on the parties but subject to Alternative Dispute Resolution (ADR) as set forth in paragraph 15.3 of this article. A demand for ADR must be made within 30 days after the date on which the party making the demand receives the Initial Decision Maker's final written decision. Failure to make such demand within 30 days shall result in the Initial Decision Maker's decision becoming final and binding upon the Owner and Contractor.

**PARAGRAPHS 15.2.6 and 15.2.6.1: DELETE IN THEIR ENTIRETY.**

**PARAGRAPHS 15.3 and 15.4: DELETE IN THEIR ENTIRETY AND SUBSTITUTE THE FOLLOWING:**

**15.3 ALTERNATIVE DISPUTE RESOLUTION**

The parties under this Contract shall have the option to resolve disputes by means of alternative dispute resolution. However, the Owner does not agree to any form of binding arbitration, mediation, or other forms of mandatory alternative dispute resolution, nor does the Owner waive any right to a jury trial. The parties shall retain their right to seek remedies in judicial proceedings.

## **ARTICLE 16**

### **INSURANCE REQUIREMENTS**

See following page for minimum insurance coverage required by this Contract.

# ARTICLE 16

## INSURANCE REQUIREMENTS

### 16.1 INSURANCE

TYPE OF INSURANCE	LIMITS OF LIABILITY	
.1 <input checked="" type="checkbox"/> Worker's Compensation	STATUTORY	
.2 Commercial General Liability including: <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Premises - Operations</li> <li><input checked="" type="checkbox"/> Underground Hazard</li> <li><input checked="" type="checkbox"/> Explosion and Collapse Hazard</li> <li><input checked="" type="checkbox"/> Products and Completed Operations</li> <li><input checked="" type="checkbox"/> Contractual Liability</li> <li><input checked="" type="checkbox"/> Independent Contractors</li> <li><input checked="" type="checkbox"/> Broad Form Property Damage</li> <li><input checked="" type="checkbox"/> Personal Injury</li> </ul>	<div> <div>\$ 1,000,000</div> <div>EACH OCCURRENCE</div> </div> <div> <div>\$ 2,000,000</div> <div>AGGREGATE *</div> </div> <div>FOR</div> <div>BOTH BODILY INJURY AND PROPERTY DAMAGE INDIVIDUALLY OR COMBINED SINGLE LIMIT</div> <div>* The aggregate limit shall be on a per project basis.</div> <div>Owner shall be additional insured. See Article 11, Subparagraph 11.1.3.</div>	
.3 Automobile Liability <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Owned</li> <li><input checked="" type="checkbox"/> Hired</li> <li><input checked="" type="checkbox"/> Non-Owner</li> </ul>	<div> <div>\$ 1,000,000</div> <div>OR</div> </div> <div> <div>\$ 1,000,000</div> <div>\$ 1,000,000</div> <div>\$ 500,000</div> </div> <div>COMBINED SINGLE LIMIT (CSL)</div> <div>BODILY INJURY (Per Person)</div> <div>BODILY INJURY (Per accident)</div> <div>PROPERTY DAMAGE</div>	
.4 Excess Liability <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Umbrella Form</li> <li><input type="checkbox"/> Other than Umbrella</li> </ul>	<div> <div>\$ 1,000,000</div> </div> <div>COMBINED SINGLE LIMIT</div>	
.5 <input type="checkbox"/> Builder's All Risk Insurance/ Installation Floater	At Contractor's Discretion	

# FEDERAL PROVISIONS

The following federal laws and regulations apply to this contract.

## NONDISCRIMINATION

The Contractor agrees that no person shall be subject to discrimination or denied benefits in connection with the Contractor's performance under this Contract. Accordingly and to the extent applicable, the Contractor covenants and agrees to comply with the following national policies on discrimination:

- a. On the basis of race, color, or national origin, in Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq.), as implemented by DoD regulations at 32 CFR Part 195;
- b. On the basis of race, color, or national origin, in Executive Order 11246 as implemented by Department of Labor regulations at 41 CFR Chapter 60;
- c. On the basis of sex or blindness, in Title IX of the Education Amendments of 1972 (20 U.S.C. Section 1681, et seq.), as implemented by DoD regulations at 32 CFR Part 196;
- d. On the basis of Age, in the Age Discrimination Act of 1975 (42 U.S.C. Section 6101 et seq.) as implemented by Department of Health and Human Services regulations at 45 CFR Part 90;
- e. On the basis of handicap, in Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. 794) as implemented by Department of Justice regulations at 28 CFR part 41 and DoD Regulations at 32 CFR Part 56.

## LOBBYING

- a. The Contractor covenants and agrees that it will not expend any funds appropriated by Congress to pay any person for influencing or attempting to influence an officer or employee of any agency, or a Member of Congress in connection with any of the following covered federal actions. The awarding of any federal contract; the making of any federal grant; the making of any federal loan; the entering into of any cooperative agreement; and, the extension, continuation, renewal, amendment, or modification of any federal contract, grant, loan, or cooperative agreement.
- b. The Final Rule, New Restrictions on Lobbying, issued by the Office of Management and Budget and the Department of Defense (32 CFR Part 28) to implement the provisions of Section 319 of Public Law 101-121 (31 U.S.C. Section 1352) is incorporated by reference and the Contractor agrees to comply with all the provisions thereof, including any amendments to the Interim Final Rule that may hereafter be issued.

## DRUG-FREE WORK PLACE

The Contractor covenants and agrees to comply with the requirements regarding drug-free workplace requirements in 32 CFR Part 26, which implements Section 5151-5160 of the Drug-Free Workplace act of 1988 (Public Law 100-690, Title V, Subtitle D; 41 U.S.C. 701 et seq.).

## ENVIRONMENTAL PROTECTION

- a. The contractor covenants and agrees that its performance under this Contract shall comply with:

- (1) The requirements of Section 114 of the Clean Air Act (42 U.S.C. Section 7414);
- (2) Section 308 of the Federal Water Pollution Control Act (33 U.S.C. Section 1318), that relates generally to inspection, monitoring, entry reports, and information, and with all regulations and guidelines issued thereunder;
- (3) The Resources Conservation and Recovery Act (RCRA);
- (4) The Comprehensive Environmental Response, Compensation and Liabilities Act (CERCLA);
- (5) The National Environmental Policy Act (NEPA);
- (6) The Solid Waste Disposal Act (SWDA);
- (7) The applicable provisions of the Clean Air Act (42 U.S.C. 7401, et seq.) and Clean Water Act (33 USC 1251, et seq.), as implemented by Executive Order 11738 and Environmental Protection Agency (EPA) rules at 40 CFR part 31;
- (8) To identify any impact this award may have on the quality of human environment and provide help as needed to comply with the National Environmental Policy Act (NEPA, 42 U.S.C 4321, et seq.) and any applicable federal, state or local environmental regulation.

- b. In accordance with the EPA rules, the parties further agree that the Contractor shall also identify to the awarding agency any impact this award may have on:

- (1) The quality of the human environment, and provide help the agency may need to comply with the National Environmental Policy Act (NEPA, at 42 U.S.C 4321, et seq.) and to prepare Environment Impact Statements or other required environmental documentation. In such cases, the recipient agrees to take no action that will have an adverse environmental impact (e.g., physical disturbance of a site such as breaking of ground) until the agency provides written notification of compliance with the environmental impact analysis process.

(2) Flood-prone areas, and provide help the agency may need to comply with the National Flood Insurance Act of 1968 and Flood Disaster Protection Act of 1973 (42 U.S.C. 4001, et seq.), which require flood insurance, when available, for federally assisted construction or acquisition in flood-prone areas.

(3) Coastal zones, and provide help the agency may need to comply with the Coastal Zone Management Act of 1972 (16 U.S.C. 1451, et seq.), concerning protection of U.S. coastal resources.

(4) Coastal barriers, and provide help the agency may need to comply with the Coastal Barriers Resource Act (16 U.S.C. 3501 et seq.), concerning preservation of barrier resources.

(5) Any existing or proposed component of the National Wild and Scenic Rivers System, and provide help the agency may need to comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. 1271 et seq.).

(6) Underground sources of drinking water in areas that have an aquifer that is the sole or principal drinking water source, and provide help the agency may need to comply with the Safe Drinking Water Act (42 U.S.C. 300H-3).

## **USE OF UNITED STATES FLAG CARRIERS**

a. The Contractor covenants and agrees that travel supported by U. S. Government funds under this agreement shall use U. S.-flag air carriers (air carriers holding certificates under 49 U. S. C. 41102) for international air transportation of people and property to the extent that such service is available, in accordance with the International Air Transportation Fair Competitive Practices Act of 1974 (49 U.S.C. 40118) and the inter-operative guidelines issued by the Comptroller General of the United States in the March 31, 1981, amendment to Comptroller General Decision B138942.

b. The Contractor agrees that it will comply with the Cargo Preference Act of 1954 (49 U.S.C. Chapter 553), as implemented by Department of Transportation regulation at 46 CFR 381.7, and 46 CFR 381.7(b).

## **DEBARMENT AND SUSPENSION**

The Contractor is subject to the non-procurement debarment and suspension regulations implementing Executive Orders 12549 and 12689, 2 CFR part 180. These regulations restrict awards, subawards, and contracts with certain parties that are debarred, suspended, or otherwise excluded from or ineligible for participation in Federal assistance programs or activities. The Contractor agrees to comply with the DOD implementation of 2 CFR Part 180 (at 2 CFR Part 1125) by checking the Excluded Parties List System (EPLS) at [www.sam.gov](http://www.sam.gov) to verify contractor eligibility to receive contracts and subcontracts resulting from this Agreement. The Contractor shall not solicit offers from, nor award contracts to contractors listed in EPLS. This verification shall be documented in the contractor contract files and shall be subject to audit by the Federal/State audit agencies.

## **BUY AMERICAN ACT**

The Contractor covenants and agrees that it will not expend any funds appropriated by Congress without complying with The Buy American Act (41 U.S.C. 10a et seq.). The Buy American Act gives preference to domestic end products and domestic construction material. In addition, the Memorandum of Understanding between the United States of America and the European Economic Community (EEC) on Government Procurement, and the North American Free Trade Agreement (NAFTA), provide that EEC and NAFTA end products and construction materials are exempted from application of the Buy American Act.

## **UNIFORM RELOCATION ASSISTANCE AND REAL PROPERTY ACQUISITION POLICIES ACT**

The Contractor covenants and agrees that it will comply with CFR 49 part 24, which implements the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 U.S.C. Section 4601 et seq.) and provides for fair and equitable treatment of persons displaced by federally assisted programs or persons whose property is acquired as a result of such programs.

## **COPELAND “ANTI-KICKBACK” ACT**

The Contractor covenants and agrees that it will comply with the Copeland “Anti-Kickback” Act (18 U.S.C. 874) as supplemented in Department of Labor regulations (29 CFR Part 3). As applied to this Contract, the Copeland “Anti-Kickback” Act makes it unlawful to induce, by force, intimidation, threat of procuring dismissal from employment, or otherwise, any person employed in the construction or repair of public buildings or public works, financed in whole or in part by the United States, to give up any part of the compensation to which that person is entitled under a contract of employment.

## **CONTRACT WORK HOURS AND SAFETY STANDARDS ACT**

The Contractor covenants and agrees that it will comply with Sections 103 and 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. Sections 3701-3708) as supplemented by Department of Labor regulations (29 CFR Part 5). As applied to this Contract, the Contract Work Hours and Safety Standards Act specifies that no laborer or mechanic doing any part of the work contemplated by this Contract shall be required or permitted to work more than 40 hours in any workweek unless paid for all additional hours at not less than 1 1/2 times the basic rate of pay.

## **UNIVERSAL IDENTIFIER REQUIREMENT**

The Contractor is required to provide their Data Universal Numbering System (DUNS) number to be in compliance with the Federal Funding Accountability and Transparency Act of 2006.



SPECIFICATIONS

FOR

**USPFO WAREHOUSE #2 REMODEL**

**BLDG. 6330**

**Camp Gilbert C. Grafton**

**Devils Lake, North Dakota**

I hereby certify that these plans and specifications were prepared by me or under my direct supervision and that I am a duly Registered Professional Architect under the laws of the State of North Dakota.

A handwritten signature in black ink, appearing to read 'Kevin J. Bartram', written over a horizontal line.

KEVIN J. BARTRAM

North Dakota Registration No. 944

Date: 19 February 2018

MUTCHLER BARTRAM ARCHITECTS

505 N Broadway, Ste 201

Fargo, North Dakota 58102

Telephone: (701) 235-5563



.01 CONSTRUCTION SCHEDULE:

- a. All material shall be ordered immediately upon award of contract.
- b. Construction work shall start, commensurate with material delivery schedule, and shall be diligently pursued to the end that all construction is totally completed on or before July 31, 2018. The time stated for completion shall include final cleanup of the premises.
- c. The foregoing completion date is based on the assumption that the successful bidder will receive the notice to proceed by March 27, 2018. The State will extend the completion date by the number of calendar days after the above date that Contractor receives the notice to proceed, except to the extent that the delay in issuance of the notice to proceed results from the failure of the Contractor to execute the contract and give the required performance and payment bonds and other data required for contract award within the time specified in the bid.
- e. NOTE: Contractor must consider that once project construction is initiated after receipt of notice to proceed, all general requirement responsibilities (i.e., project superintendence, contractor coordination, scheduling, utilities, temporary field office facilities/controls, etc.) will continue for the duration of the entire construction period.
- f. Scheduled completion date carries a liquidated damages clause (see Article 13 of Supplementary General Conditions of the Contract for Construction - AGND Document 415). Contractors and subcontractors shall recognize the importance of their responsibilities in completing their work on or ahead of schedule and in strict cooperation with each other.
- g. The Contractors shall furnish not less than forty-eight (48) hours notice prior to starting work. Notice shall be furnished to the Director of Facilities Engineering - COL Clark V. Johnson, P. E., Fraine Barracks, Bismarck, North Dakota - Telephone: (701) 333-2075 and to Mr. Greg Oakland, AIA, Mutchler Bartram Architects, 505 North Broadway, Suite 201, Fargo, North Dakota - Telephone: (701) 235-5563.
- h. In order to complete the work in the stipulated time, the Contractor may elect to work longer than eight (8) hours in any one day, or forty (40) hours in any one (1) week. However, he must notify the Office of the Adjutant General's field representative of his intentions to do so not less than twenty-four (24) hours before the scheduled overtime. The Contractor's Project Superintendent/Foreman MUST BE on the job site supervising ALL scheduled overtime work.

.02 SCOPE OF WORK:

- a. Extent of drawings and specifications defining all work to be performed under this contract are listed on cover sheet of specification book. It is the bidding Contractor's sole responsibility to verify that he has received all sheets of plans and specifications as no claim for extra cost will be allowed due to the lack of complete information at the time of bid.

- b. Equipment or work indicated on plans to be "By Owner" or "N.I.C." is not to be included in bid proposal or construction contract.
- c. The Contractor's responsibilities for installing Owner furnished products shall include, but not be limited to:
- (1) Review Owner furnished shop drawings, product data, samples, etc.
  - (2) Receive and unload products at site; inspect for completeness or damages, jointly with Owner.
  - (3) Handle, store, install, and finish products.
  - (4) Repair or replace items damaged after receipt.

.03 ASTM DESIGNATIONS:

Shall be latest edition for all sections of specifications. Materials specified to comply to a certain standard (ASTM or other) shall be delivered to job properly labeled and identified. If material is not labeled, Contractor shall furnish a certificate of compliance from manufacturer.

.04 TERMINOLOGY:

- a. Requirements of all Specification Sections A through I and Division 01000 extend and apply to all work required of all contractors, subcontractors, material suppliers, etc., set forth in other divisions of the specifications.
- b. Where the term "include" is used under Scope of Work paragraphs of subsequent specification sections, this shall be interpreted to mean items of work therein listed may be a part, but not necessarily the total limit, of the work required by such section. Contractor shall examine drawings and specification documents.
- c. Where specifications are abbreviated type, they indicate complete sentences in the same manner as when a note occurs in the Drawings. Omissions of words such as "the Contractor shall" or "as shown on Drawings" is intentional. The words "shall" or "shall be" are to be supplied by inference. The term "provide" shall mean "furnish and install in place".
- d. Where a number is listed in the specifications (as for gauges, weights, temperatures, amount of time, etc.), the number shall be interpreted as that or better.

.05 SITE LAYOUT AND MEASUREMENTS:

- a. The General Contractor shall be responsible for setting reference points, layout and establishing building lines, and elevations. Each Contractor shall have full responsibility in preserving all stakes, reference points, bench marks, etc. In the case of destruction, damage and/or disturbance thereof by a Contractor resulting from his negligence, that Contractor shall be charged with the expense and damage resulting therefrom, to include any costs associated with re-establishment of such stakes, reference points, bench marks, etc.

- b. Each Contractor shall, upon entering project site for purposes of beginning work, locate all general reference points and take such action as is necessary to prevent their destruction; lay out his own work and be responsible for all lines, elevations, and measurements of buildings, grading, utilities, and other work executed by him under contract. Such building lines thus established shall be maintained for use of all Contractors and subcontractors. All Contractors must exercise proper precaution to verify figures shown on drawings before layout work as they will be held responsible for any error resulting from failure to exercise such precaution.
- c. Figured dimensions shall be followed in preference to measurements by scale; large scale drawings shall take precedence over those of a small scale. Figures on all drawings, as detail drawings themselves are, in every case, subject to measurements of adjacent or incorporated completed work. All such necessary measurements shall be taken before undertaking any work dependent upon such data. Report any discrepancies to Architect/Engineer for clarification before proceeding with work.
- d. Where, on any drawings, a portion of work is drawn out and remainder is indicated in outline, parts drawn out or indicated by symbols or instructions by word description shall apply also to all other like portions of the work.
- e. Where existing work is added to or modified, the Contractors shall be responsible to verify existing dimensions and conditions. Any existing condition which affects a Contractors new work should be verified for accuracy. This includes, but is not limited to, such items as clearances, dimensions, existing equipment, existing services, working conditions, etc.
- f. Where a clear understanding of the work is prevented, due to discrepancies, contradictions, or omissions on contract documents or subsequently issued instructions (regardless of source), Contractor shall not proceed with work and Architect/Engineer should be consulted for clarification of the uncertainty. Should any mistake result due to pursuit of work without this clarification, Contractor must make necessary corrections at his expense and as directed by Architect/Engineer.

.06 LOCATION OF UTILITIES:

- a. It shall be each Contractor's responsibility to familiarize himself with location of all existing sewer mains, storm mains, water mains, gas mains, telephone cables, cable TV, power lines, street light wiring, and all of their associated service lines, and appurtenances such as poles, guy wires, supports, pads, valve boxes, stop boxes, manholes, and clean-outs pertaining to utility service. Each respective Contractor shall be responsible for notifying North Dakota One-Call at 1-800-795-0555 at least 48 hours before beginning any excavation, excluding Saturdays, Sundays, and holidays, and shall comply with all requirements of Section 49-23 of the North Dakota Century Code. The respective Contractor shall hire a qualified technician to locate those underground utility lines that are not covered by the North Dakota One-Call system. All costs associated with locating all utilities shall be the responsibility of the respective Contractor.
- b. Each respective Contractor for the project will be held responsible for damage to any underground or overhead piping, wiring, or other utility property, occurring during any excavation or construction by the respective Contractor or his subcontractors.

.07 CONTRACTOR COORDINATION:

a. General Contractor shall employ a full-time, on site Project Superintendent(s) who will be responsible for continuous overall coordination between general, mechanical, and electrical phases of work and he shall be the Contractor's liaison with Architect/Engineer and Owner's on site representative. Project Superintendent shall have a minimum of five (5) years experience in the field, and be approved by the Architect/Engineer and Owner before onset of work. He shall be maintained by the General Contractor throughout the project and not be replaced without approval of the Architect/Engineer and Owner.

b. Mechanical and Electrical Contractors shall each employ a Project Foreman who will be responsible for continuous coordination with all phases of respective Contractors work. He shall be the Contractors liaison with Architect/Engineer, Owner's representative and General Contractor's Project Superintendent. Project Foreman shall have a minimum of five (5) years experience in the field, and be approved by the Architect/Engineer, and Owner before onset of work. He shall be maintained by the Contractor throughout the project and not be replaced without approval of the Architect/Engineer and Owner. Refer to Divisions 22, 23, 26, 31, and 32 for other required qualifications.

c. The General Contractor shall, upon conferring with the Mechanical and Electrical Contractors and subcontractors, prepare and submit to the Architect/Engineer, within ten (10) days of contract award, three (3) copies of the proposed construction progress schedule for approval, all in accordance with Para. 3.10, Article 3 of Supplementary General Conditions of the Contract for Construction (AGND Document 415). Upon written approval of the proposed schedule by all parties concerned (i.e., Architect/Engineer, Owner, and each respective Contractor, the General Contractor shall furnish three (3) copies each to Mechanical and Electrical Contractors, and one (1) copy each to its testing company and general subcontractors. Mechanical and Electrical Contractors shall furnish one (1) copy each to their respective testing company and subcontractors. This shall serve as advance notice for their scheduling of materials, deliveries and installations to conform with the overall construction network plan.

- (1) The construction schedule shall consist of a bar chart showing the order and interdependence of activities and the sequence in which the work is to be accomplished as agreed to by ALL Contractors. The project completion date (July 31, 2018) WILL BE shown on the chart as the latest completion date of ALL activities.
- (2) The bar chart shall be scaled using units of approximately one-half inch equals one week or other suitable scale approved by Architect/Engineer. Weekends and holidays shall be indicated. The chart shall show the principal categories of work corresponding with those used in the breakdown on which the progress payments are based.
- (3) The chart shall indicate ALL key building phases (i.e., completion dates of owner construction sequence items, sitework, building completely enclosed, delivery and installation of key items of equipment, etc.) to include other phases and sequences as required by Architect/Engineer and Owner.

d. The General Contractor's Project Superintendent(s) responsibilities shall include, but not be limited to:

- (1) Consult the contract drawings and specifications of all trades to verify and coordinate the location of the various building components and items to be installed by all Contractors. Review the daily work schedules of all Contractors for a minimum of interferences to the work of other Contractors. This work includes (but is not limited to) installation of sleeves in masonry walls for electrical and mechanical pipes and fire damper openings.
- (2) Consult and cooperate with all Contractors and their subcontractors/installers for all work to determine space requirements and adequate clearances with respect to other equipment in the building. Architect/Engineer reserves the right to determine space priority in the event of interference between piping, conduit, equipment, furnishings, etc., of various trades.
- (3) Inspect, report to the Architect/Engineer and coordinate the removal, relocation and reconnection of any installed work which interferes with the work of other trades. All work, as directed, shall be at the expense of the installing Contractor.
- (4) Hold specific daily coordination meetings for each element of the work, maintain written documentation of events, report to Architect/Engineer at regular (weekly) project meetings.
- (5) Keep the Architect/Engineer and Owner's Representative fully informed of the progress of the work and endeavor to safeguard the Owner against any defects and deficiencies in all the Work.

e. The General Contractor's Project Superintendent shall coordinate all arrangements for project progress meetings which shall be held at maximum weekly. Attendance shall include Architect/Engineer, Owner's Representative(s), all Prime Contractors and their Superintendents/Foremen. All subcontractors and suppliers involved in current major phases of work shall also be in attendance.

- (1) The General Contractor's Project Superintendent shall, after consultation with Architect/Engineer, Owner's Representative and other Prime Contractors, prepare and furnish agenda with copies for participants.
- (2) The shall preside at the meetings, record minutes and distribute copies within two (2) working days to Engineers, Owner, Prime Contractors, and Project Superintendent. It shall be each Contractors responsibility to immediately distribute copies to respective subcontractors, suppliers and installers who were participants and/or affected by the decisions made.

- (3) The general purpose of the progress meeting shall be to: review previous meeting minutes; review work progress as it relates to each entities present and future needs including interface requirements; identify problems which are or may impede planned progress; review submittal schedules, delivery schedules, site access and utilization, temporary facilities and controls and progress cleaning requirements; review of progress schedule and determination of corrective measures to regain projected schedule to include firm commitments from responsible entities; review and coordinate planned progress for succeeding work period; review and coordinate change orders; update progress schedule as required; and conduct any other business relating to the Work.
  - (4) Immediately following the progress meeting, the Project Superintendent shall review and coordinate all items listed in the minutes.
  - (5) When revisions to project schedule have been made, to include all necessary approvals, the General Contractor shall reissue revised schedules in accordance with previous paragraph .07c.
- f. The General Contractor will not be responsible for construction means, methods, techniques, procedures, or for safety precautions and programs, or for the safety of workmen of Mechanical and Electrical Contractors in connection with the work, all of which shall be the responsibility of each respective Contractor. He will not be responsible for any other respective Contractor's failure to carry out the work in accordance with the contract documents.
- g. General Contractor shall provide lintels, bucks, openings and recesses required for installation of all work unless specified to the contrary. He shall notify all other Contractors of work schedules sufficiently in advance so they can cooperate with him and be responsible for proper location and sizes of openings required for their work.
- h. Mechanical and Electrical Contractors shall furnish and properly install all bucks, sleeves, conduit hanging devices, backing for hanging devices, etc., pertinent to their work. Failure on part of these Contractors to properly work with General Contractor in providing and placing of openings, recesses, etc., for their work as outlined above will not relieve them of the expense of putting these openings, recesses, etc. in later and repairing such cut construction to the satisfaction of the Architect/Engineer.
- i. Contractors and subcontractors shall:
- (1) Be mutually responsible, one to another, to prevent any delays in construction schedule. No one shall erect any portion of his work where it is necessary that work of others shall be erected first or carried on simultaneously without having first given other superintendents reasonable notice of his intentions.
  - (2) Coordinate scheduling, submittals, and work of the various sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.



- (3) Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various contractors, subcontractors, installers and/or suppliers having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
  - (4) Coordinate space requirements and installation of mechanical and electrical work which is indicated diagrammatically on drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
  - (5) In finished areas (except as otherwise indicated), conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- j. Limitations on site usage as well as specific requirements that impact site utilization are indicated on the drawings and by other contract documents. General Contractor shall administer allocation of available space equally among entities needing both access and space so as to produce the best overall efficiency in performance of the total work of the project. Each Contractor shall schedule deliveries so as to minimize space and time requirements for storage of materials and equipment on site. Architect shall be sole judge as to allocation of available space in case of dispute.

#### 08 WORKMANSHIP:

- a. Manufacturer's printed instructions covering details of installation shall be followed where not in conflict with these specifications. If there is a conflict, notify the Architect/Engineer and obtain his approval before proceeding.
- b. Completed work shall be left plumb, level, true to line or plane, anchored securely in place, and free from damage.
- c. Unless otherwise called for, all pieces of material shall be as large a stock size as is in conformity with standard good practice of the trade.
- d. Except where in conflict with these specifications, current manufacturer's printed specifications of herein specified proprietary products are made part of these specifications.

#### .09 PUBLIC CONVENIENCE:

- a. The Contractor shall, at all times, so conduct his work as to insure the least possible obstruction to traffic and inconvenience to National Guard operational activities, the general public and the residents in the vicinity of the work, and to insure the protection of persons and property. No road or street shall be closed to the public except with the permission of the proper authorities. Fire hydrants on or adjacent to the work shall be kept accessible to fire fighting equipment at all times.

b. The Contractors shall cooperate and coordinate with the Owner in scheduling the work to accommodate National Guard operation and other construction activities occurring simultaneously.

.10 PRE-CONSTRUCTION MEETING:

Not more than fifteen (15) days after date of notice to proceed, the Architect/Engineer/Owner shall call a pre-construction meeting. Required in attendance shall be Architect, Engineers, Owner's representative(s), Contractors and their Superintendent/Foremen together with their major subcontractors and suppliers. The general purpose of meeting will be to: review contract documents; review Owner procedures, documentation requirements, and general project overview agenda; procedures for processing of subcontractors approval, product approval, schedule of values and progress schedule; designation of personnel representing the Architect, Engineers, Owner, and Contractors; procedures for processing field decisions, submittals, applications for payment, proposal requests and change orders; coordinate temporary facilities and controls; and discuss any other items of concern which relate to the Work.

.11 BUILDING PERMIT:

a. A building permit is not required for this project. All other fees, permits, licenses, bonds, etc., are the individual responsibility of the respective Contractors in accordance with other pertinent sections of these specifications and should be included in their bids.

b. This facility is subject to inspection by state building code officials. Any costs that will be incurred by the contractor for inspections by state building code officials shall be included in that contractors bid.

.01 GENERAL INFORMATION:

- a. Bidders may ONLY submit separate bids for general construction work, mechanical construction work, and electrical construction work. No other types of bids for other portions of the project or combinations of the separate bids will be accepted.
- b. The determination of lowest and best Bidder and respective single contract amount for all work required for each type of bid will be the sum of selected Bid Item(s), and respective Alternates (if any) as determined by the Owner.
- c. Bidders must bid on all Bid Item(s) and Alternates (if any) specified within the type bid being submitted. Bidder may state his refusal to accept award of less than the combination of Bid Item(s) and Alternates (if any) he so stipulates. The Bidder shall make no additional stipulations on the Bid Form nor qualify his bid in any other manner.
- d. In preparing his bid, Bidder is instructed to thoroughly familiarize himself with requirements herein so that his bid will be properly assembled and presented for Owner consideration.
- e. Refer to "Invitation to Bid"; Article 4 of AIA Document A701; and Article 4 of AGND Document 411 "Supplementary Instructions to Bidders" regarding procedures for submission of bids.
- f. Prior to the award of the Contract, to enable the Owner to separate costs for funding purposes and as a condition of contract approval, the low bidder(s) may be required to clearly identify cost breakouts of specific items as required by the Owner.

.02 BID ITEMS AND ALTERNATES:

- a. General Construction - Separate Bid for ALL General Work:

BID ITEM NO. G-1  
(USPFO Warehouse  
Remodel - General  
Construction)

State the total cost for all work in connection with the complete General Construction of the USPFO Warehouse Remodel as shown on the drawings and as herein specified (specification Divisions 02 through 09; including all work associated with general construction and ALL costs associated with general requirements (Specification Division 01000) TO INCLUDE Testing Laboratory Services and other related general requirements shall be included in this bid item.

b. Mechanical Construction - Separate Bid for ALL Mechanical Work:

BID ITEM NO. M-1:  
(USPFO Warehouse  
Remodel - Mechanical  
Construction)

State the total cost for all work in connection with the complete Mechanical Construction of the USPFO Warehouse Remodel as shown on the drawings and as herein specified (Specification Divisions 22 and 23); including all work associated with mechanical construction and ALL costs associated with general requirements (Specification Division 01000) TO INCLUDE Testing Laboratory Services and other related general requirements shall be included in this bid item.

c. Electrical Construction - Separate Bid for ALL Electrical Work:

BID ITEM NO. E-1:  
(USPFO Warehouse  
Remodel - Electrical  
Construction)

State the total cost for all work in connection with the complete Electrical Construction of the USPFO Warehouse Remodel as shown on the drawings and as herein specified (Specification Divisions 26 and 27); including all work associated with electrical construction and ALL costs associated with general requirements (Specification Division 01000) TO INCLUDE Testing Laboratory Services and other related general requirements shall be included in this bid item.

END OF SECTION 01200

.01 SCOPE OF WORK:

a. Wherever possible throughout the contract documents, the minimum acceptable quality of workmanship and material has been defined by manufacturer's name and catalog number or by reference to recognized industry standards.

b. To ensure that the specified products are furnished and installed in accordance with design intent, procedures have been established for advance submittal of design data and for its review and approval or rejection by the Architect/Engineer.

c. Related Work Described Elsewhere:

- (1) Contractual requirements for submittals: General Conditions and Supplementary Conditions.
- (2) Individual submittals required: Pertinent sections of these specifications.

.02 PRODUCT HANDLING:

Make all submittals of Shop Drawings, samples, requests for substitutions, and other items in strict accordance with the provisions of this section of these specifications.

.03 SUBSTITUTIONS:

a. Prior Approval Required:

- (1) The Contract is based on the material, equipment, and methods described in the Contract Documents. The material, 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.
- (2) No substitution will be considered unless written request for approval has been received by the Architect/Engineer at least ten (10) days prior to the date of 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/Engineer's decision of approval or disapproval of a proposed substitution shall be final.
- (3) Those requesting Architect/Engineer consideration of their products "equals" shall make such request in electronic PDF format providing space for Architect/Engineer approval and/or comments on each item requested. An electronic PDF copy of the

request form, with Architect/Engineer action on same, will be returned to the proposer.

- (4) If the Architect/Engineer 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.
- (5) No substitutions will be considered after the Contract award unless specifically provided in the Contract Documents. Under no condition shall Bids be submitted on work or materials not approved by the Architect/Engineer for this specific project, even though approval might have been given on other projects previously.

b. Or Equal:

- (1) Where the phrase "or equal" or "or approved equal" or "or equal as approved by the Architect/Engineer" occurs in the Contract Documents, do not assume that material, equipment or methods will be approved as equal by the Architect/Engineer unless the item has been specifically approved for this work by the Architect/Engineer in electronic PDF format prior to receipt of Bids by Addendum, all in accordance with procedure outlined in above paragraph .03 a "Prior Approval Required".
- (2) The decision of the Architect/Engineer shall be final.

c. Availability of Specified Items:

- (1) Verify, prior to bidding, that all specified items will be available in time for installation during orderly and timely progress of the work.
- (2) In the event specified item or items will not be available, so notify the Architect/Engineer prior to receipt of bids.
- (3) Costs of delays because of non-availability of specified items, when such delays could have been avoided by the Contractor, will be backcharged as necessary and shall not be borne by the Owner.

.04 IDENTIFICATION OF SUBMITTALS:

Completely identify each submittal and resubmittal by showing at least the following information:

- a. Name and address of submitter, plus name and telephone number of the individual who may be contacted for further information.
- b. Name of project as it appears on each page of these Specifications.
- c. Pertinent drawing sheet and detail number(s), and specification section number, as appropriate, to which the submittal applies.

- d. Whether this is an original submittal or resubmittal.

.05 COORDINATION OF SUBMITTALS:

- a. General: Prior to submittal for Architect/Engineer's review, use all means necessary to fully coordinate all materials, including the following procedures:

- (1) Determine and verify all field dimensions and conditions, materials, catalog number and similar data.
- (2) Coordinate, as required, with all trades and with all public agencies involved. Secure all necessary approvals from public agencies and others and signify by stamp, or other means, that they have been secured.
- (3) Clearly indicate all deviations from the Contract Documents.

- b. Grouping of Submittals: Unless otherwise specifically permitted by the Architect/Engineer, make all submittals in groups containing all associated items; the Architect/Engineer may reject partial submittals as not complying with the provisions of the Contract Documents.

- c. Prior to submittal, Contractor shall apply Contractor's stamp, signed or initialed certifying that review, verification of products required, field dimensions, adjacent construction work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.

- d. Provide space for Contractor, Architect/Engineer, and Owner review stamps.

- e. Revise and resubmit submittals as required, identify all changes made since previous submittal.

- f. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

.06 TIMING OF SUBMITTALS:

- a. General:

- (1) Make all submittals far enough in advance of scheduled dates of installation to provide all required time for review, for securing necessary approvals, for possible revision and resubmittal, and for placing orders and securing delivery.
- (2) In scheduling, allow at least ten (10) full working days for the Architect/Engineer's review following his receipt of the submittal.

- b. Delays: Costs of delays occasioned by tardiness of submittals may be backcharged to the Contractor and shall not be borne by the Owner.

.07 SHOP DRAWINGS:

- a. Unless otherwise specifically directed by the Architect/Engineer, submit newly prepared information drawn accurately to scale. Highlight, encircle, or otherwise indicate deviations from the contract documents. Do not reproduce contract documents or copy standard information as the basis of shop drawings. Standard information prepared without specific reference to the project is not a shop drawing. All Contractors shall indicate on the shop drawing submittal that they have reviewed and approved it prior to forwarding it to the Architect/Engineer for review.
- b. Shop drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Include the following information:
- (1) Dimensions.
  - (2) Identification of products and materials included by sheet and detail number.
  - (3) Compliance with specified standards.
  - (4) Notation of coordination requirements.
  - (5) Notation of dimensions established by field measurement.
- c. Type of Prints Required: Unless otherwise specifically directed by the Architect/Engineer, submit all shop drawings with sheet sizes up to and including 11"x17" in electronic PDF format. Shop drawings with a sheet size larger than 11"x17" may be submitted either in an electronic PDF format or in the form of opaque reproductions. Original reproducible transparencies are not acceptable.
- d. Number of Prints Required: Submit one copy of electronic shop drawings. For opaque reproductions, submit the number of prints which the Contractor requires, plus five (5) copies which will be retained by the Architect/Engineer.
- e. Distribution: After review and approval by Architect/Engineer, Contractor shall provide and distribute all copies required for this purpose and as required by subcontractors, suppliers, manufacturers, installers, etc.

.08 SAMPLES:

- a. Accuracy of Sample: Unless otherwise specifically directed by the Architect/Engineer, all samples shall be of the precise article proposed to be furnished and shall illustrate the functional and aesthetic characteristics of the product.
- b. Number of Samples Required: Submit all samples in the quantity which is required to be returned plus three (3) which will be retained by the Architect/Engineer.



.09 COLORS:

- a. General: Unless the precise color and pattern is specifically described in the Contract Documents, whenever a choice of color or pattern is available in a specified product, submit accurate color charts and pattern charts from the full range of manufacturer's standards to the Architect/Engineer for his review and selection.
- b. Comparative Analysis: Unless all available colors and patterns have identical costs and identical wearing capabilities, and are identically suited for the installation, completely describe the relative costs and capabilities of each.

.10 MANUALS:

- a. General: Unless otherwise specifically directed by the Architect/Engineer elsewhere in the specifications, prepare all required manuals covering items included in this work in accordance with the following:
  - (1) Operation and maintenance data shall be submitted electronically in PDF format on Read/Write (R/W) Compact Disks (CDs) formatted to allow the data to be read and copied to and from the CD. Each CD and its case shall be professionally labeled with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of CD.
    - (a) Provide a file folder containing a master index at beginning of each CD's electronic manual file structure showing items included. The CD shall be subdivided with file folders and subfolders logically organized and labeled to allow ease of access to the data.
    - (b) First section of the Contractors CD shall consist of directory listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, subcontractors, and major equipment suppliers.
    - (c) Provide file folders/subfolders for each type of equipment arranged in order similar to the specifications. All sections shall be clearly labeled on the CD. At beginning of each section provide suppliers name, address and phone numbers.
  - (2) Descriptive Literature:
    - (a) Include descriptive literature (manufacturer's catalog and data) of each manufactured item. Literature shall show capacities and size of equipment used and be marked indicating each specific item with applicable data underlined.
    - (b) Copy of the approved Shop Drawing(s) with all data concerning changes made during construction.

- b. Extraneous Data: Where contents of the electronic manuals include manufacturer's catalog pages, clearly indicate the precise items included in this installation and delete, or otherwise clearly indicate, all manufacturer's data with which this installation is not concerned.
- c. Material Safety Data Sheets: Any materials installed that have an associated Material Safety Data Sheet (MSDS) shall be included in the maintenance manuals under a separate tab.
- d. Number of Copies Required: The Contractor shall provide one copy of their electronic maintenance manual to the Architect/Engineer for review. Unless otherwise specifically directed by the Architect/Engineer, the Contractor shall deliver three (3) approved CDs to the Architect/Engineer before final inspection.

.11 PROJECT RECORD DOCUMENTS:

- a. General:
  - (1) Specific requirements for record documents are indicated in individual sections of these specifications. Other requirements are indicated in the General Conditions. General submittal requirements are indicated in the various "submittals" sections.
  - (2) Maintain on site, one set of the following record documents and record actual revisions to the Work:
    - (a) Contract Drawings.
    - (b) Specifications.
    - (c) Addenda.
    - (d) Change Orders and other Modifications to the Contract.
    - (e) Reviewed shop drawings, product data, and samples.
  - (3) Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Architect/Engineer's reference during normal working hours.
- b. Record Drawings: The Contractor shall maintain a record set of blue line white-prints of contract drawings and shop drawings in clean, undamaged condition. All subcontractors shall record work variations on the Contractor's record set. Mark-up the set of record documents to show the actual installation where the installed work varies from the work as originally shown. Mark whichever drawings are most capable of showing the actual "field" condition fully and accurately; however, where shop drawings are used for mark-up, record a cross reference at corresponding locations on the working drawings. Give particular attention to concealed work that would be difficult to measure and record at a later date.

- (1) Mark record set with red erasable pencil and, where feasible, use other colors to distinguish between variations in separate categories of work. Mark-up new information which is known to be important to the Owner but, for some reason, was not shown on either contract drawings or shop drawings.
  - (2) The Contractor shall, during the progress of the work, keep accurate data on locations and elevations of underground/concealed work so that he may prepare a survey containing the final exact elevations and locations of all such work, especially that work for which an elevation or dimensional location is indicated and/or specified within the plans and/or specifications.
    - (a) Measured depths of foundations in relation to finish main floor datum.
    - (b) Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
    - (c) Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
    - (d) Field changes of dimension and detail.
    - (e) Details not on original Contract Drawings.
  - (3) Note related change order numbers where applicable.
  - (4) Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set. Submit to Architect/Engineer.
- c. Record Specifications:
- (1) Legibly mark and record at each Product section description of actual Products installed, including the following:
    - (a) Manufacturer's name and product model and number.
    - (b) Product substitutions or alternates utilized.
    - (c) Changes made by Addenda and Modifications.
  - (2) Upon completion of mark-up, submit a complete record specification to Architect/Engineer for Owner's records.

d. Record Product Data:

- (1) Maintain one copy of each product data submittal. Mark these documents to show variations in the actual work performed in comparison with the submitted information. Include both variations in the products as delivered to the site, and variations from manufacturer's instructions and recommendations for installation. Give particular attention to concealed products and portions of the work which cannot otherwise be readily discerned at a later date by direct observation. Note related change orders and mark-up of record drawings and specifications.
- (2) Upon completion of mark-up, submit complete set of record product data to the Architect/Engineer for the Owner's records.

e. Miscellaneous Record Submittals: Refer to other sections of these specifications for requirements of miscellaneous record-keeping and submittals in connection with the actual performance of the work. Immediately prior to the date or dates of substantial completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference. Submit to the Architect/Engineer for the Owner's records.

.12 WARRANTIES:

- a. Provide duplicate notarized copies.
- b. Execute and assemble documents from subcontractors, suppliers, and manufacturers.
- c. Provide Table of Contents and assemble in three (3) ring binder with durable plastic cover.
- d. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within ten (10) days after acceptance, listing date of acceptance as start of warranty period.

.01 SCOPE OF WORK:

- a. Extent of work of this section includes all labor, material, equipment, and services necessary for and reasonably incidental to the testing of material as shown on the drawings and specified herein.
- b. Employment of testing laboratory shall in no way relieve Contractor of obligation to perform work in accordance with requirements of Contract Documents.
- c. The Testing Laboratory shall be retained by the Contractor, at no additional expense to the Owner. The Testing Laboratory shall act as the Owner's agent in all matters relating to material testing, and shall report to the Owner and take instructions from the Contractor after Owner and Architect/Engineer approval of instructions has been granted.
- d. It shall be the responsibility of all Contractors to familiarize themselves with all sections of these specifications to allow the Testing Laboratory to perform their duties at the proper sequence of construction without any hindrance or delays.
- e. Additional requirements for testing are described in various sections of these specifications.
- f. Contractor shall be responsible for retaining a prior approved single testing laboratory to perform all services for the respective work responsibility under this section.
- g. **NOTE:** The quality control testing required on this project is a significant part of the overall project. Bidder is CAUTIONED to thoroughly familiarize himself with the testing requirements and the costs to provide them.

.02 APPROVED TESTING LABORATORIES:

The following laboratories are approved: Braun Intertec Testing Services, Inc.; Geoserve, Inc.; Northern Technologies, Inc.; Materials Testing Services, Inc.; and Terracon Consultants, Inc.

.03 TESTING LABORATORY REQUIREMENTS:

- a. Each person in charge of laboratory testing, field testing, and inspection must have not less than one (1) year of full-time experience in the duties required to be performed under this Contract and shall perform such duties only under the direct supervision of a registered engineer.
- b. The Testing Laboratory shall perform all tests described herein and any additional tests requested by Owner. When it appears that the material furnished, or work performed by the Contractor, fails to meet the construction contract requirements, the Testing Laboratory shall direct the attention of the Owner and Architect/Engineers to such failure.
- c. Meetings: Representatives of the Testing Laboratory **shall attend** pre-construction conferences and all project progress meetings when so directed by Architect/Engineer, Owner, Owners Representative, and Contractors, at no additional cost to the Owner.

- d. Written Reports: Submit all test reports to Owner, Architect/Engineer (if applicable), Contractor and respective subcontractor (if applicable) within seventy-two (72) hours after each test is completed unless specified otherwise in these specifications.
- e. Verbal Reports: Testing Laboratory is to give verbal notification, to Owner and Architect/Engineers, immediately, of any irregularity to ensure all necessary retesting and/or replacement of material with the least possible delay in progress of the Work.
- f. Test Standards: Testing Laboratory shall furnish the Architect/Engineer and Owner, upon request, one (1) copy of each standard (ASTM, AASHTO, and AWS) referred to or which is pertinent to these specifications.
- g. The testing requirements shall remain in force for the full duration of the construction contract, including all delays or time extensions.

.04 PAYMENT FOR TESTING SERVICES:

- a. Initial Services:
  - (1) The Contractor will pay for all initial testing services requested by these specifications. Costs for all such testing services shall be included in Contractor's proposal.
  - (2) The Contractor will pay for all initial testing services requested by the Owner which are not specifically required by these specifications, and upon completion and acceptance of all work, an equitable adjustment shall be effected thereof by appropriate Change Order in accordance with paragraph 7.2.2 of Supplementary General Conditions EXCEPT that, if such initial tests indicate noncompliance with the Contract Documents, the costs of initial tests associated with that noncompliance shall be borne entirely by the Contractor.
- b. Retesting: When initial tests indicate noncompliance with the Contract Documents, all subsequent retesting occasioned by the noncompliance shall be performed by the same Testing Laboratory and the costs thereof will be borne entirely by the Contractor.

.05 TAKING SPECIMENS:

- a. All specimens and samples for testing will be taken only by the Testing Laboratory; all sampling equipment and personnel will be provided by the Testing Laboratory; and all deliveries of specimens and samples to the Testing Laboratory will be performed only by the Testing Laboratory.
- b. Contractor shall provide representatives of the Testing Laboratory access to the work at all times in order that the Laboratory may properly perform its functions.

.06 SCHEDULES FOR TESTING:

- a. Establishing Schedule: By advance discussion with the Testing Laboratory, the Contractor shall determine the time required for the Laboratory to perform its tests and to issue each of its findings.
- b. When changes of construction schedule are necessary during construction, the Contractor shall coordinate all such changes of schedule with the Testing Laboratory.
- c. When the Testing Laboratory is ready to test specimens but cannot due to incompleteness of the work, all extra costs for testing attributable to the delay will be backcharged to the Contractor and shall not be borne by the Owner.

.07 CODE COMPLIANCE TESTING:

Inspections and tests required by codes or ordinances, or by a plan approval authority, and made by a legally constituted authority, shall be the responsibility of and shall be paid for by the Contractor, unless otherwise provided in the Contract Documents.

.08 CONTRACTOR'S CONVENIENCE TESTING:

Inspection or testing performed exclusively for Contractor's convenience shall be the sole responsibility of the Contractor.

.09 EXCAVATION & BACKFILLING AND SUBGRADE:

- a. A registered Civil Engineer with a minimum of 5 years of providing geotechnical observation experience and prior approval by Owner and Architect/Engineer, representing the Testing Laboratory, shall observe all site excavations prior to the placement of any engineered fill and footings, including excavation over-size.
- b. The Testing Laboratory shall test and approve each lift placed prior to the placement of any additional lifts. Maximum depth of clay engineered fill - 6 inches. Maximum depth of granular engineered fill - 1 foot.
  - (1) Determine maximum density and optimum moisture content of each type of fill, backfill and subgrade material using ASTM D698-Standard Proctor, "Moisture-Density Relations of Soils."
  - (2) Conduct field density tests in accordance with ASTM D1556, "Density of Soil In-Place by the Sand-Cone Method"; or ASTM D2922, "Density of Soil and Soil-Aggregate In-Place by Nuclear Methods".
    - (a) One test for each 250 square yards of sub-base.

- (b) One test for each 250 square yards per one foot lift, or fraction thereof, of fill or backfill.
- (c) One test for each 250 square yards of subgrade.
- (d) One test for each 200 linear feet of sidewalk and curb and gutter.
- (e) One test along trenches at maximum 100 foot intervals per 18 inches of vertical lift and at changes in required density EXCEPT for non-paved areas where tests shall be at maximum 100 foot intervals per 3 feet of vertical lift.
- (f) One test for each 200 linear feet of mechanical/electrical/communication trenching.
- (g) For each isolated parcel less than 250 square yards, 200 linear feet and 100 foot intervals per 18 inch lift (or 3 foot lift if applicable), take at least two tests.

c. The Soils Engineer shall observe and approve the final excavated subgrade elevations prior to the placement of any sub-base, base and pavement materials.

d. The Testing Laboratory shall observe and approve of all dewatering procedures during construction operations. Testing Laboratory shall make a written report concerning conditions of site during every site visitation. This shall include any observed items which might affect the project quality (including but not limited to the following: site dewatering, curing of concrete slabs, and protection of equipment and materials).

e. Furnish test reports in accordance with paragraph .03d.

.10 CONCRETE:

a. The Testing Laboratory shall prepare the concrete mix design for each type of concrete used on the job.

b. The Testing Laboratory shall perform batch plant inspections to verify that the ready mix producer is in compliance with the requirements as established by the National Ready Mix Concrete Association for Batch Plant Certification, and until concrete quality is established to the satisfaction of the Owner and Architect/Engineer. Periodic inspections shall be performed thereafter as determined by the Testing Laboratory and with the concurrence of the Owner and Architect/Engineer. Periodically inspect and test batch proportioning equipment for accuracy.

c. The Testing Laboratory shall run a laboratory trial batch mix for each type of concrete proposed for use on the site to determine proper mix proportions, to include gradation and quality of coarse and fine aggregates.



- d. The Testing Laboratory shall sample and test aggregates and mix ingredients as necessary to insure compliance with specifications.
- e. The Testing Laboratory shall sample and test aggregates as necessary for moisture content. Request that adjustments be made in quantities of mixing water and aggregates as necessary to maintain water-cement ratio of approved design mixes.
- f. The Testing Laboratory shall certify, in duplicate, that ingredients and proportions and amount of ingredients in concrete conform with approved trial mixes. When concrete is batched or mixed off immediate building site, the Ready-Mix supplier shall certify (by signing, initialing, or stamping thereon) on delivery slips (duplicate) that ingredients in truck load mixes conform to proportions of aggregate weight, cement factor and water-cement ratio of approved trial mixes.
- g. The Testing Laboratory shall:
- (1) Provide a field representative at site during placement of concrete to perform concrete sampling and testing.
  - (2) Take concrete samplings in accordance with ASTM C172. Mold and cure four compression test cylinders for each 50 cubic yards or fraction thereof for each concrete type per day. After good concrete quality control has been established and maintained, make four cylinders for each 100 cubic yards or fraction thereof for each concrete type per day. Label each cylinder with an identification number. Owner may require additional cylinders to be molded and cured under job conditions.
  - (3) Test slump of concrete periodically and during making of concrete test cylinders. Method of making slump test shall be described in ASTM C143.
  - (4) When air-entrained concrete is being placed, determine air content at least daily during progress of such work and during making of concrete test cylinders. Determine air content by either ASTM C173 or ASTM C231.
  - (5) If slump of air content falls outside specified limits, another test shall be made immediately from another portion of same batch.
  - (6) Insure maintenance of water-cement ratio established by approved trial mix.
  - (7) Notify batch plant of mix irregularities and request materials and proportioning check.
  - (8) Verify that specified mixing has been accomplished.

h. Laboratory Tests of Field Samples:

- (1) Test compression test cylinders for strength in accordance with ASTM C39. For each test series, test one (1) cylinder at seven (7) days, one (1) cylinder at fourteen (14) days and one (1) cylinder at twenty eight (28) days. The remaining cylinder will be used as a spare to be tested at either 7, 28, 56 or 90 day test as required. No further compression tests on each test series are required after specified strengths have been met.
- (2) Furnish compression test reports in accordance with paragraph .03d. On test reports indicate following information:
  - (a) Cylinder identification number and date cast.
  - (b) Specific location at which test samples were taken.
  - (c) Type of concrete, slump and percent air.
  - (d) Compressive strength of concrete in psi.
  - (e) Weather conditions during placing.
  - (f) Temperature of concrete.
  - (g) Maximum and minimum ambient temperature during placing.
  - (h) Ambient temperature when concrete sample in test cylinder was taken.
  - (i) Date delivered to laboratory and date tested.

.01 SCOPE OF WORK:

a. Work Included: Temporary facilities and controls required for this Work include, but are not necessarily limited to:

- (1) Temporary utilities such as heat, water, lighting and power and telephone.
- (2) Field office and storage sheds.
- (3) Sanitary facilities.
- (4) Enclosures such as tarpaulins, barricades and canopies.
- (5) Access roads and parking areas.

b. Except that all equipment furnished by subcontractors shall comply with all requirements of pertinent safety regulations, the ladders, planks, hoists, and similar items normally furnished by the individual trades in execution of their own portions of the Work are not part of this section.

c. Permanent installation and hook-up of the various utility lines are described in the pertinent other sections of these specifications.

.02 PRODUCT HANDLING:

Use all means necessary to maintain temporary facilities and controls in proper and safe condition throughout progress of the Work.

.03 JOB CONDITIONS:

Make all required connections to existing utility systems with minimum disruption to the existing utility systems. When disruption of the existing service is required, do not proceed without the Owner's authorized representative's approval and, when required, provide alternate temporary service(s) at no additional cost to the Owner.

.04 UTILITIES:

a. General:

- (1) All temporary facilities shall be subject to the Owner Representative's approval and shall be confined to areas authorized or approved by Owner Representative or Owner. The Contractor shall hold and save the Owner, its officers, and agents, free and harmless from liability of any nature occasioned by his temporary facilities.

- (2) When Architect/Engineer certifies that total project is substantially completed and ready for occupancy, Owner shall assume all respective expenses for utilities (i.e., water, lighting & power, and heating), including protection and operating of such systems, from date of substantial completion. NOTE: General Contractor MUST CONSIDER that his responsibility for temporary utilities WILL BE required until the project completion date as specified in Specification Section 01100 "Summary of Work." If total project is NOT substantially completed and ready for Owner occupancy by stated completion date, all responsibilities for temporary utilities will continue as specified until substantial completion. Occupancy determination will also be dependent upon completion of all exterior site items so as to allow functional access to the entire site for the Owner's operational activities intended.
- b. Water: Owner shall make all reasonably required amounts of water available to the Contractor from existing outlets and supplies unless otherwise specified herein. The Contractor shall carefully conserve any utilities furnished.
- c. Light & Power:
- (1) During the Building Addition phase General Contractor shall arrange with local power supplier and pay for all temporary electricity required by ALL Contractors for light and power construction operations. General Contractor shall arrange to run in necessary temporary, secondary service(s) to a pole(s) location(s) on the construction site as approved by the Owner Representative. Costs of this service and work will be borne by the General Contractor. NOTE: General Contractor shall coordinate with Electrical Contractor in determining type and size of temporary secondary service required.
- (2) The Electrical Contractor shall provide weatherproof, grounded power distribution system with ground fault protection sufficient to accommodate ALL construction operations requiring power until adequate power can be provided from permanent wiring devices (coordinate with ALL Contractors). Provide a minimum of six (6) 120 volt duplex receptacles for power tools, etc. Provide a minimum of one (1) 30 amp. 208 volt, single phase receptacle for welding.
- (3) The Electrical Contractor shall furnish and maintain adequate lighting conditions to accommodate ALL construction operations (minimum of 20 foot candles per room) until permanent fixtures are installed (coordinate with ALL Contractors). Lighting circuits shall be separate from power circuits.
- (4) Task lighting, wiring, devices, etc., shall be provided by respective Contractor requiring same.
- (5) Owner Representative shall be sole judge of amount of temporary wiring or lamps needed in case of dispute.

- (6) The General Contractor shall furnish and maintain a separate power service for all heating devices.
- (7) During the Building Alteration phase the Owner shall make all reasonably required amounts of power available to the Contractor from existing outlets and supplies unless otherwise specified herein. Electrical power SHALL NOT be used for heating. The Contractor shall carefully conserve any utilities furnished.

d. Telephone:

- (1) General, Mechanical, and Electrical Contractor shall provide separate temporary telephones during construction period, to be located in respective temporary field offices and elsewhere within the building as required by Owner Representative. Cell Phones are acceptable.
- (2) The General Contractor shall provide a FAX machine and a photocopier at field office for joint use of Owner Representative, other Prime Contractors and subcontractors. Long distance FAX usage by other Prime Contractors and subcontractors shall be charged to the respective user.

e. Heat:

- (1) The General Contractor shall be responsible for providing all heat sufficient to protect all work and materials prior to Owner's acceptance of Work. A minimum temperature of 50 degrees F. shall be maintained in spaces (construction shelters, building enclosures, etc.) involved at all times. (see individual specification section for additional heating requirements. Under no conditions shall temperatures of enclosed units of construction be allowed to be less than 50 degrees F., whether or not any construction operations are being performed in those areas; and it will be the responsibility of the General Contractor to furnish all heating devices to maintain these temperatures.
- (2) The General Contractor shall furnish, place, connect and ventilate all temporary heating devices required to maintain a uniform tempered construction environment. Cost of service for lines and for fuel and power used for this service is to be borne by General Contractor.
- (3) All temporary heating devices in or adjacent to the building are subject to Owner Representative's approval. Portable units must be vented. Smokeless units must be provided at times and locations necessary to prevent smoke damage or stains to building or materials. Temporary devices used inside building, when fully or partially enclosed, shall be acceptable smokeless and vented natural gas fired or electric heaters with motor-driven fan. Use of propane fired devices is prohibited.

- (4) The use of permanent heating system to include any portion thereof, is NOT permitted UNLESS specifically agreed to in writing by Owner, Owner Representative, General Contractor, Mechanical Contractor, and Electrical Contractor. NOTE: Specific conditions regarding protection, maintenance, adjustment, service, cleaning and warranty will have to be addressed.
  - (5) Remove any and all non-permanent heating devices, etc., used for temporary heat when they are no longer needed.
  - (6) Owner Representative shall be sole judge as to amount of temporary heat and enclosures needed in case of dispute. The General Contractor must provide adequate personnel and mechanical surveillance of heating devices to prevent over or under heating whenever heating devices are in operation.
- f. Ventilation: The General Contractor shall provide and maintain all ventilation necessary in enclosed areas to assist cure of materials, to dissipate humidity and to prevent accumulation of dust, fumes, vapors, or gasses. All costs for these services shall be borne by the General Contractor.

.05 FIELD OFFICE AND STORAGE:

- a. Temporary field office trailers/buildings are not a requirement for this project, however the Owner has no objection to Contractors providing and maintaining such offices on the building site. Expenses for all utilities, services, equipment and furnishings for each temporary field office shall be the responsibility of the respective Contractor.
- b. Each Contractor shall provide storage buildings as required for storage of materials requiring protection from elements. Remove same when work is complete.
- c. Subcontractors shall provide storage buildings for their own use on job, or shall arrange, at their expense, with the respective Contractor to provide such space for them. Such storage structures shall be removed when construction is complete.

.06 FIELD TOILET:

General Contractor shall provide and maintain field toilet(s) as necessary for use of all workers and in sufficient numbers for each sex. These shall be located where expedient and maintained in strict sanitary condition. Remove all field toilet facilities when the project is complete.

.07 ENCLOSURES:

Furnish, install and maintain for the duration of construction all required scaffolds, tarpaulins, barricades, canopies, warning signs, steps, bridges, platforms, safety nets and all other temporary construction or devices necessary for proper completion of the Work in compliance with all safety and other regulations.

.08 ACCESS ROADS AND PARKING AREAS:

- a. Respective Contractors, in strict accordance with all regulations governing use of site, will use the parking and staging areas designated by the Owner. Repair all damaged areas resulting from construction activities.
- b. General Contractor shall provide access up to the building. Sufficient gravel (minimum 4 inches) will be placed over the access to these areas to allow for all-weather uninterrupted use, to include snow removal. All work and materials will be provided by General Contractor and costs associated with this work are considered a part of building general requirements and should be included in Bid Item No. G-1.

.09 MAINTENANCE AND REMOVAL:

Maintain all temporary facilities and controls as long as needed for the safe and proper completion of the Work. Remove all such temporary facilities and controls as rapidly as progress of the Work will permit, or as directed by the Owner Representative. Restore permanent facilities used during construction to specified condition.

.10 LAND AND RIGHTS-OF-WAY:

The Owner shall furnish all land and rights-of-way required for completion of all construction under this Contract. The Contractor shall not enter onto private property during the completion of this Contract. If the Contractor requires additional area over and above the rights-of-way and easements as shown on the plans, he shall make these arrangements at his own expense. If such additional areas are acquired by the Contractor for his use, the Owner will in no way be responsible for any accidents or claims arising out of such arrangement.





.01 SCOPE OF WORK:

- a. Throughout the construction period, maintain the building and site in a standard of cleanliness as described in this Section.
- b. In addition to standards described in this Section, comply with requirements for cleaning as described in pertinent other sections of these specifications.

.02 QUALITY ASSURANCE:

- a. Conduct daily inspection, and more often if necessary, to verify that requirements for cleanliness are being met.
- b. In addition to the standards described in this Section, comply with pertinent requirements of governmental agencies having jurisdiction.

.03 CLEANING MATERIALS AND EQUIPMENT:

- a. Provide required personnel, equipment and material needed to maintain the specified standard of cleanliness.
- b. Use only the cleaning materials and equipment which are compatible with the surface being cleaned as recommended by the manufacturer of the material.

.04 PROGRESS CLEANING:

- a. General:
  - (1) Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage and providing required protection of material.
  - (2) Do not allow accumulation of scrap, debris, waste material and other items not required for construction of this Work.
  - (3) At least once each week, and more often if necessary, completely remove all scrap, debris and waste material from the job site.
  - (4) Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the ecology.
- b. Site:
  - (1) Daily, and more often if necessary, inspect the site and pick up all scrap, debris and waste material. Remove such items to the place designated for their storage.

- (2) Weekly, and more often if necessary, inspect all arrangement of material stored on the site. Restack, tidy, or otherwise service arrangements to meet the requirements of subparagraph .04.a.(1) above.
- (3) Maintain the site in a neat and orderly condition at all times. Weekly, and more often if necessary, remove waste materials, debris and rubbish from site and dispose of in an acceptable manner.

c. Building:

- (1) Daily, and more often if necessary, inspect the structure and pick up all scrap, debris and waste material. Remove such items to the place designated for their storage.
- (2) Weekly, and more often if necessary, sweep interior spaces clean. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and hand-held broom.
- (3) As required, preparatory to installation of succeeding material, clean the structure or pertinent portions to the degree of cleanliness recommended by the manufacturer of the succeeding material, using equipment and material required to achieve the necessary cleanliness.
- (4) Remove debris and rubbish from pipe chases, plenums, crawl spaces, and other closed and remote spaces prior to enclosing the space.
- (5) Following the installation of finish floor materials, clean the finish floor daily (and more often if necessary) at all times while work is being performed in the space in which finish materials are installed. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from foreign material which, in the opinion of the Architect, may be injurious to the finish floor material.

d. Architect shall be sole judge as to cleaning responsibility in case of dispute.

.05 FINAL CLEANING:

- a. The Contractor shall have overall responsibility for all final cleaning requirements unless otherwise specifically indicated.
- b. "Clean", for the purpose of this Article, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and material. Comply with all manufacturer's instructions/recommendations regarding cleaning operations.

c. Prior to completion of the Work, Contractor shall remove from the job site all tools, surplus material, equipment, scrap, debris and waste; and conduct final progress cleaning as described in paragraph .04 above.

d. Site:

- (1) Unless otherwise specifically directed by the Architect/Engineer, broom clean paved areas on the site and public paved areas adjacent to the site.
- (2) Completely remove resultant debris.
- (3) Rake grounds that are neither paved nor planted, to a smooth, even-textured surface.
- (4) Concrete: Remove all rough surfaces resulting from form marks, ties, patching, etc. Fill large voids and where surface is to be coated with a separate finish material, fill all voids including air pockets, etc. Fill material to be of type best suited to job condition and as approved by the Engineer.

e. Building:

(1) Exterior:

- (a) Visually inspect exterior surfaces and remove all traces of soil, waste material, smudges and other foreign matter.
- (b) Remove all traces of splashed material from adjacent surfaces.
- (c) If necessary to achieve a uniform degree of cleanliness, hose down the exterior of the structure.
- (d) In the event of stubborn stains not removable with water, the Owner Representative may require light sandblasting or other cleaning at no additional cost to the Owner.

(2) Interior:

- (a) Visually inspect interior surfaces and remove all traces of soil, waste material, smudges, and other foreign matter.
- (b) Remove all traces of splashed material from adjacent surfaces.
- (c) Remove spots, stains, films, dust, dirt, and similar noticeable distracting substances from finished surfaces.
- (d) Restore reflective surfaces to original reflective condition.

- (e) Leave concrete floors broom clean.
  - (f) Remove labels which are not required as permanent labels.
  - (3) Concrete: Remove all rough surfaces resulting from form marks, ties, patching, etc. Fill large voids and, where surface is to be coated with a separate finish material, fill all voids including air pockets, etc. Fill material to be of type best suited to job condition and as approved by the Architect/Engineer.
  - (4) Painted and Decorated Work: Remove all foreign marks, stains, fingerprints, scuffs, and other soil or dirt. If paint surface appearance is altered by cleaning process, refinish spot or area as required to match with overall adjacent surface. Vacuum or wipe down all surfaces to remove dust just prior to Owner occupancy.
  - (5) Hardware: Remove all stains, paint, fingerprints, and other foreign matter; wash and polish to original finish. If any factory applied lacquer is damaged by job materials resulting in a permanent stain, hardware item must be replaced at General Contractor's expense.
  - (6) Building Equipment: General Contractor shall wipe surfaces of all General Contractor installed building equipment clean, including all accessible interior spaces. Remove excess lubrication and other substances.
  - (7) Mechanical Equipment: Mechanical Contractor shall wipe surfaces of mechanical and equipment clean, including all accessible interior spaces. Remove excess lubrication and other substances.
  - (8) Electrical Equipment: Electrical Contractor shall wipe surfaces of electrical equipment clean, including all accessible interior spaces. Remove excess lubrication and other substances.
  - (9) Light Fixtures: Electrical Contractor shall clean all light fixtures and lamps. Replace lamps as necessary.
  - (10) Ventilation Systems: Mechanical Contractor is to clean out any debris in ductwork and vacuum entire duct system prior to final inspection.
- f. Schedule final cleaning as approved by the Architect/Engineer to enable the Owner to accept a completely clean Work.
- g. Architect shall be sole judge as to final cleaning responsibilities in case of dispute.

END OF SECTION 01600

.01 DESCRIPTION:

Closeout is hereby defined to include general requirements of the Contractor near end of Contract Time in preparation for final acceptance, final payment, normal termination of contract, occupancy by Owner and similar actions evidencing completion of the Work. Specific requirements for individual units of work are specified in relative sections of these specifications. Time of closeout is directly related to "Substantial Completion" and, therefore, may be either a single time period for entire work or a series of time periods for individual parts of the work which have been certified as substantially complete at different dates. That time variation shall be applicable to other provisions of this section.

.02 QUALITY ASSURANCE:

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

.03 PROCEDURES:

a. Substantial Completion:

- (1) Contractor will submit a written request to the Architect/Engineer along with a list of ALL items to be completed and/or corrected.
- (2) Within a reasonable time after receipt of the list, the Architect/Engineer will either proceed with inspection or advise Contractor of prerequisites not fulfilled.
- (3) Following the initial inspection, should the Architect/Engineer determine that the Work is not substantially complete:
  - (a) The Architect/Engineer will promptly notify the Contractor, in writing, giving the reasons therefore.
  - (b) The Contractor will remedy the deficiencies and notify the Architect/Engineer when ready for reinspection.
  - (c) The Architect/Engineer will reinspect the Work when assured that the work has been substantially completed.
- (4) When the Architect/Engineer concurs that the Work is substantially complete:
  - (a) The Owner will prepare a "Certificate of Substantial Completion" on AIA Document G704, accompanied by the Architect/Engineer's final inspection report and submit to all parties concerned for their written acceptance of the responsibilities assigned to them in the Certificate.

- (5) Certificate of Substantial Completion will identify initial "punchlist" for final acceptance.

b. Final Completion:

- (1) Prior to requesting Architect/Engineer's final re-inspection for certification of final acceptance, assure that all items on Architect/Engineer's final "punchlist" have been completed, corrected, or otherwise resolved for acceptance.
- (2) Submit copy of Architect/Engineer's final punchlist of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance.
- (3) Certify that:
  - (a) Contract Documents have been reviewed.
  - (b) Work has been inspected for compliance with the Contract Documents.
  - (c) Work has been completed in accordance with the Contract Documents.
  - (d) Work is completed and ready for final inspection.
- (4) The Architect/Engineer will make an inspection to verify status of completion.
- (5) Should the Architect/Engineer determine that the Work is incomplete or defective:
  - (a) The Architect/Engineer will promptly notify the Contractor, in writing, listing the incomplete or defective work.
  - (b) The Contractor shall remedy the deficiencies promptly, and notify the Architect/Engineer when ready for inspection.
- (6) When the Architect/Engineer determines that the Work is acceptable under the Contract Documents, he will request the Contractor to make closeout submittals.

c. Closeout Submittals and Actions: Closeout submittals and actions include, but are not necessarily limited to:

- (1) All items specifically required under Paragraph 9.10.6 of the Supplementary General Conditions (AGND Document 415).
- (2) Evidence of final, continuing insurance coverage complying with insurance requirements. Include certificate of insurance for products and completed operations where required. Advise Owner of pending insurance change-over requirements.

- (3) Final liquidated damages settlement statement (if any), acceptable to Owner.
  - (4) Specific warranties, workmanship/maintenance bonds, maintenance agreements, final certifications and similar documents.
  - (5) Evidence of compliance with requirements of governmental agencies having jurisdiction for Certificates of Inspection. Obtain and submit release enabling Owner's full and unrestricted use of the work and access to services and utilities.
  - (6) Submit maintenance manuals and similar final record information, to include MSDS information. See Specification Section 01300.
  - (7) Complete final cleaning-up requirements, including touch-up, repair and/or restoration of marred surfaces. See Specification Section 01600.
  - (8) Discontinue (or change over) and remove from project site temporary facilities and services, along with construction tools and facilities and similar elements.
- d. Contractors shall also comply with specific requirements as discussed in other sections of these specifications.

.04 FINAL PAYMENT:

Neither the final payment nor the remaining retained percentage shall become due until Contractor completes all the above requirements of this specification section.

END OF SECTION 01700





**SECTION 02 4100**  
**DEMOLITION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Selective demolition of building elements for alteration purposes.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Temporary Enclosures: May consist of sound salvage materials free of nails, splinters and sharp points.

**PART 3 EXECUTION**

**3.01 SCOPE**

**3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS**

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
  - 1. Provide, erect, and maintain temporary barriers and security devices.
  - 2. Do not close or obstruct roadways or sidewalks without permit.
- B. Do not begin removal until receipt of notification to proceed from Owner.
- C. Protect existing structures and other elements that are not to be removed.
- D. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.

**3.03 EXISTING UTILITIES**

- A. Protect existing utilities to remain from damage.
- B. Do not disrupt public utilities without permit from authority having jurisdiction.
- C. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- D. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

**3.04 SELECTIVE DEMOLITION FOR ALTERATIONS**

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
  - 1. Verify that construction and utility arrangements are as shown.
  - 2. Report discrepancies to Architect before disturbing existing installation.
  - 3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
- B. Remove existing work as indicated and as required to accomplish new work.
  - 1. Remove items indicated on drawings.
- C. Protect existing work to remain.
  - 1. Prevent movement of structure; provide shoring and bracing if necessary.
  - 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
  - 3. Repair adjacent construction and finishes damaged during removal work.
  - 4. Patch as specified for patching new work.

**3.05 DEBRIS AND WASTE REMOVAL**

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

**END OF SECTION**

## **SECTION 03 1000 CONCRETE FORMING AND ACCESSORIES**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Formwork for cast-in place concrete, with shoring, bracing and anchorage.
- B. Openings for other work.
- C. Form accessories.
- D. Form stripping.

#### **1.02 REFERENCE STANDARDS**

- A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2010.
- B. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).
- C. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.
- D. ACI 347R - Guide to Formwork for Concrete; 2014.

#### **1.03 SUBMITTALS**

- A. See Section 01300 - Submittals and Substitutions.
- B. Shop Drawings: Indicate pertinent dimensions, materials, bracing, and arrangement of joints and ties.

#### **1.04 QUALITY ASSURANCE**

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

### **PART 2 PRODUCTS**

#### **2.01 FORMWORK - GENERAL**

- A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.
- B. Design and construct to provide resultant concrete that conforms to design with respect to shape, lines, and dimensions.
- C. Chamfer outside corners of beams, joists, columns, and walls.
- D. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.
- E. Comply with relevant portions of ACI 347R, ACI 301, and ACI 318.

#### **2.02 WOOD FORM MATERIALS**

- A. Form Materials: At the discretion of the Contractor.
- B. Softwood Plywood: PS 1, C Grade, Group 2.
- C. Softwood Plywood: PS 1, B-B High Density Concrete Form Overlay, Class I.
- D. Plywood: Douglas Fir species; solid one side grade; sound undamaged sheets with clean, true edges.

#### **2.03 REMOVABLE PREFABRICATED FORMS**

- A. Manufacturers:
  - 1. Alabama Metal Industries Corporation: [www.amico-online.com](http://www.amico-online.com).
  - 2. Molded Fiber Glass Construction Products Co: [www.mfgcp.com](http://www.mfgcp.com).
  - 3. SureVoid Products, Inc.: [www.surevoid.com](http://www.surevoid.com).
  - 4. Substitutions: See Section 01300 - Submittals and Substitutions.

- B. Preformed Steel Forms: Minimum 16 gage, 0.0598 inch (1.52 mm) thick, matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.
- C. Preformed Plastic Forms: Thermoplastic polystyrene form liner, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.
- D. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces.
- E. Pan Type: Glass fiber, of size and profile indicated.

## **2.04 FORMWORK ACCESSORIES**

- A. Form Ties: Removable type, galvanized metal, fixed length, cone type, with waterproofing washer, free of defects that could leave holes larger than 1 inch (25 mm) in concrete surface.
- B. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.
  - 1. Composition: Colorless reactive, mineral oil-based, soy-based, or vegetable-oil based compound.
  - 2. Do not use materials containing diesel oil or petroleum-based compounds.
  - 3. VOC Content: In compliance with applicable local, State, and federal regulations.
  - 4. Products:
    - a. SpecChem, LLC; Bio Strip WB (water-based): [www.specchemllc.com](http://www.specchemllc.com).
    - b. W.R. Meadows, Inc.; Duogard: [www.wrmeadows.com](http://www.wrmeadows.com).
    - c. Substitutions: See Section 01300 - Submittals and Substitutions.
- C. Filler Strips for Chamfered Corners: Rigid plastic type; maximum possible lengths.
- D. Dovetail Anchor Slot: Galvanized steel, at least 22 gage, 0.0299 inch (0.76 mm) thick, foam filled, release tape sealed slots, anchors for securing to concrete formwork.
- E. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.
- F. Embedded Anchor Shapes, Plates, Angles and Bars.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

### **3.02 ERECTION - FORMWORK**

- A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.
- B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to oversteering by construction loads.
- C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
- D. Align joints and make watertight. Keep form joints to a minimum.
- E. Obtain approval before framing openings in structural members that are not indicated on drawings.
- F. Install void forms in accordance with manufacturer's recommendations. Protect forms from moisture or crushing.

- G. Coordinate this section with other sections of work that require attachment of components to formwork.
- H. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instructions from the Architect before proceeding.

### **3.03 APPLICATION - FORM RELEASE AGENT**

- A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
- B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
- C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

### **3.04 INSERTS, EMBEDDED PARTS, AND OPENINGS**

- A. Provide formed openings where required for items to be embedded in passing through concrete work.
- B. Locate and set in place items that will be cast directly into concrete.
- C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.
- D. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.
- E. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

### **3.05 FORM CLEANING**

- A. Clean forms as erection proceeds, to remove foreign matter within forms.
- B. Clean formed cavities of debris prior to placing concrete.
  - 1. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

### **3.06 FORMWORK TOLERANCES**

- A. Construct formwork to maintain tolerances required by ACI 117, unless otherwise indicated.

### **3.07 FIELD QUALITY CONTROL**

- A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.

### **3.08 FORM REMOVAL**

- A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.
- B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- C. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

**END OF SECTION**



## **SECTION 03 2000 CONCRETE REINFORCING**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Reinforcing steel for cast-in-place concrete.
- B. Supports and accessories for steel reinforcement.

#### **1.02 REFERENCE STANDARDS**

- A. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).
- B. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.
- C. ACI SP-66 - ACI Detailing Manual; 2004.
- D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2015.
- E. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2015.
- F. AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel; 2011.
- G. CRSI (DA4) - Manual of Standard Practice; 2009.
- H. CRSI (P1) - Placing Reinforcing Bars; 2011.

#### **1.03 SUBMITTALS**

- A. See Section 01300 - Submittals and Substitutions, for submittal procedures.
- B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.

#### **1.04 QUALITY ASSURANCE**

- A. Perform work of this section in accordance with ACI 301.

### **PART 2 PRODUCTS**

#### **2.01 REINFORCEMENT**

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa).
  - 1. Deformed billet-steel bars.
- B. Steel Welded Wire Reinforcement (WWR): Galvanized, deformed type; ASTM A1064/A1064M.
- C. Reinforcement Accessories:
  - 1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch (1.29 mm).
  - 2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

#### **2.02 FABRICATION**

- A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.
- B. Welding of reinforcement is permitted only with the specific approval of the Architect. Perform welding in accordance with AWS D1.4/D1.4M.
  - 1. Galvanized Reinforcement: Clean surfaces, weld and re-protect welded joint in accordance with CRSI (DA4).
- C. Locate reinforcing splices not indicated on drawings at point of minimum stress.

### **PART 3 EXECUTION**

#### **3.01 PLACEMENT**

- A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
- B. Accommodate placement of formed openings.

- C. Maintain concrete cover around reinforcing as follows:
  - 1. Supported Slabs and Joists: 2 inch.
  - 2. Walls: 2 inch.
  - 3. Footings and Concrete Formed Against Earth: 2 inch.
  - 4. Slabs on Fill: 2 inch.
- D. Conform to applicable code for concrete cover over reinforcement.

**END OF SECTION**



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

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Elevated concrete slabs.
- B. Floors and slabs on grade.
- C. Concrete walls.
- D. Joint devices associated with concrete work.
- E. Concrete curing.

#### **1.02 REFERENCE STANDARDS**

- A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2010.
- B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).
- C. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).
- D. ACI 302.1R - Guide for Concrete Floor and Slab Construction; 2004 (Errata 2007).
- E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000.
- F. ACI 308R - Guide to Curing Concrete; 2001 (Reapproved 2008).
- G. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.
- H. ACI 347R - Guide to Formwork for Concrete; 2014.
- I. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2015.
- J. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2013.
- K. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2015a.
- L. ASTM C150/C150M - Standard Specification for Portland Cement; 2015.
- M. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2014.

#### **1.03 SUBMITTALS**

- A. See Section 01300 - Submittals and Substitutions.
- B. Mix Design: Submit proposed concrete mix design.
  - 1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.

#### **1.04 QUALITY ASSURANCE**

- A. Perform work of this section in accordance with ACI 301 and ACI 318.

### **PART 2 PRODUCTS**

#### **2.01 FORMWORK**

- A. Comply with requirements of Section 03 1000.

#### **2.02 REINFORCEMENT**

- A. Comply with requirements of Section 03 2000.

#### **2.03 CONCRETE MATERIALS**

- A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
  - 1. Acquire all cement for entire project from same source.

- B. Fine and Coarse Aggregates: ASTM C 33.
  - 1. Acquire all aggregates for entire project from same source.
- C. Shale: Concrete mixes shall not contain any shale aggregate.
- D. Water: Clean and not detrimental to concrete.

#### **2.04 ACCESSORY MATERIALS**

- A. Underslab Vapor Retarder: Multi-layer, fabric-, cord-, grid-, or aluminum-reinforced polyethylene or equivalent, complying with ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. The use of single ply polyethylene is prohibited.
  - 1. Installation: Comply with ASTM E1643.
  - 2. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations in vapor retarder.
  - 3. Manufacturers:
    - a. Fortifiber Building Systems Group; Moistop Ultra 10: [www.fortifiber.com/sle](http://www.fortifiber.com/sle).
    - b. Insulation Solutions, Inc; Viper VaporCheck II 10-mil (Class A): [www.insulationsolutions.com](http://www.insulationsolutions.com).
    - c. Stego Industries, LLC: [www.stegoindustries.com](http://www.stegoindustries.com).
    - d. W.R. Meadows, Inc.; PERMINATOR Class A - 10 mils (0.25 mm): [www.wrmeadows.com](http://www.wrmeadows.com).
    - e. Substitutions: See Section 01300 - Submittals and Substitutions.

#### **2.05 CURING MATERIALS**

- A. Curing Compound, Non-dissipating: Liquid, membrane-forming, clear, non-yellowing acrylic; complying with ASTM C309.
  - 1. Vehicle: Water-based.
  - 2. Manufacturers:
    - a. Dayton Superior Corporation; Cure & Seal 309 J18: [www.daytonsuperior.com](http://www.daytonsuperior.com).
    - b. Kaufman Products Inc.; Krystal 15 Emulsion: [www.kaufmanproducts.net](http://www.kaufmanproducts.net).
    - c. L&M Construction Chemicals, Inc., a subsidiary of Laticrete International, Inc.; Dress & Seal WB: [www.lmcc.com](http://www.lmcc.com).
    - d. The QUIKRETE Companies; QUIKRETE® Acrylic Concrete Cure & Seal: [www.quikrete.com](http://www.quikrete.com).
    - e. SpecChem, LLC; Cure and Seal WB: [www.specchemllc.com](http://www.specchemllc.com).
    - f. W.R. Meadows, Inc.; VOCOMP-20: [www.wrmeadows.com](http://www.wrmeadows.com).
    - g. Substitutions: See Section 01300 - Submittals and Substitutions.

#### **2.06 CONCRETE MIX DESIGN**

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
  - 1. For trial mixtures method, employ independent testing agency acceptable to Design Professional's Spec Term for preparing and reporting proposed mix designs.
- C. Normal Weight Concrete:
  - 1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 3,000 pounds per square inch (20.7 MPa).
  - 2. Water-Cement Ratio: Maximum 40 percent by weight.
  - 3. Total Air Content: 4 percent, determined in accordance with ASTM C173/C173M.
  - 4. Maximum Slump: 3 inches (75 mm).
  - 5. Maximum Aggregate Size: 5/8 inch (16 mm).

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify lines, levels, and dimensions before proceeding with work of this section.

### **3.02 PREPARATION**

- A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
- B. Verify that forms are clean and free of rust before applying release agent.
- C. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
- D. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
- E. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.
- F. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Lap joints minimum 6 inches (150 mm). Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.

### **3.03 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS**

- A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.
- B. Furnish Install and Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

### **3.04 PLACING CONCRETE**

- A. Place concrete in accordance with ACI 304R.
- B. Place concrete for floor slabs in accordance with ACI 302.1R.
- C. Notify the Architect not less than 24 hours prior to commencement of placement operations.
- D. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
- E. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.
- F. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

### **3.05 SLAB JOINTING**

- A. Locate joints as indicated on the drawings.
- B. Anchor joint fillers and devices to prevent movement during concrete placement.
- C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
- D. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16 inch (5 mm) thick blade and cut at least 1 inch (25 mm) deep but not less than one quarter (1/4) the depth of the slab.

### **3.06 FLOOR FLATNESS AND LEVELNESS TOLERANCES**

- A. Maximum Variation of Surface Flatness:
  - 1. Exposed Concrete Floors: 1/4 inch (6 mm) in 10 feet (3 m).

- B. Correct the slab surface if tolerances are less than specified.
- C. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

### **3.07 CONCRETE FINISHING**

- A. Repair surface defects, including tie holes, immediately after removing formwork.
- B. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch (6 mm) or more in height. Provide finish as follows:
  - 1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
- C. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
  - 1. Surfaces to Receive Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, thin set quarry tile, and thin set ceramic tile.
  - 2. Decorative Exposed Surfaces: Trowel as described in ACI 302.1R; use steel-reinforced plastic trowel blades instead of steel blades to avoid black-burnish marks; decorative exposed surfaces include surfaces to be stained or dyed, pigmented concrete, surfaces to receive liquid hardeners, surfaces to receive dry-shake hardeners, surfaces to be polished, and all other exposed slab surfaces.
- D. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains as indicated on drawings.

### **3.08 CURING AND PROTECTION**

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
- C. Surfaces Not in Contact with Forms:
  - 1. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water- fog spray, or saturated burlap.
  - 2. Final Curing: Begin after initial curing but before surface is dry.

### **3.09 DEFECTIVE CONCRETE**

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- B. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing and concrete replacement shall be borne by the Contractor when defective concrete is identified.

### **3.10 PROTECTION**

- A. Do not permit traffic over unprotected concrete floor surface until fully cured.

**END OF SECTION**

**SECTION 06 1000**  
**ROUGH CARPENTRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Structural dimension lumber framing.
- B. Non-structural dimension lumber framing.
- C. Rough opening framing for doors, windows, and roof openings.
- D. Miscellaneous framing and sheathing.
- E. Concealed wood blocking, nailers, and supports.
- F. Miscellaneous wood nailers, furring, and grounds.

**1.02 REFERENCE STANDARDS**

- A. AFPA (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; 2012.
- B. PS 20 - American Softwood Lumber Standard; 2010.

**1.03 DELIVERY, STORAGE, AND HANDLING**

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

**PART 2 PRODUCTS**

**2.01 GENERAL REQUIREMENTS**

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
  - 1. Species: Douglas Fir-Larch, unless otherwise indicated.
  - 2. Lumber of other species or grades is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.

**2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS**

- A. Sizes: Nominal sizes as indicated on drawings, S4S.
- B. Moisture Content: S-dry or MC19.
- C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
  - 1. Lumber: S4S, No. 2 or Standard Grade.
  - 2. Boards: Standard or No. 3.

**PART 3 EXECUTION**

**3.01 INSTALLATION - GENERAL**

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

**3.02 FRAMING INSTALLATION**

- A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.
- B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.
- C. Install structural members full length without splices unless otherwise specifically detailed.
- D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AFPA Wood Frame Construction Manual.

- E. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.
- F. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

### **3.03 BLOCKING, NAILERS, AND SUPPORTS**

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- C. Provide the following specific non-structural framing and blocking:
  - 1. Cabinets and shelf supports.
  - 2. Wall brackets.
  - 3. Handrails.
  - 4. Grab bars.
  - 5. Towel and bath accessories.
  - 6. Wall-mounted door stops.

### **3.04 TOLERANCES**

- A. Framing Members: 1/4 inch (6 mm) from true position, maximum.
- B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet (2 mm/m) maximum, and 1/4 inch in 30 feet (7 mm in 10 m) maximum.

### **3.05 CLEANING**

- A. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
- B. Prevent sawdust and wood shavings from entering the storm drainage system.

**END OF SECTION**

**SECTION 06 2000**  
**FINISH CARPENTRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Finish carpentry items.

**1.02 REFERENCE STANDARDS**

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.

**1.03 QUALITY ASSURANCE**

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Protect work from moisture damage.

**PART 2 PRODUCTS**

**2.01 FINISH CARPENTRY ITEMS**

- A. Quality Grade: Unless otherwise indicated provide products of quality specified by AWI/AWMAC/WI (AWS) for Custom Grade.
- B. Interior Woodwork Items:
  - 1. Moldings, Bases, Casings, and Miscellaneous Trim: Clear white pine; prepare for paint finish.

**2.02 FABRICATION**

- A. Shop assemble work for delivery to site, permitting passage through building openings.
- B. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify adequacy of backing and support framing.

**3.02 INSTALLATION**

- A. Install work in accordance with AWI/AWMAC/WI (AWS) requirements for grade indicated.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch (0.79 mm). Do not use additional overlay trim to conceal larger gaps.

**3.03 PREPARATION FOR SITE FINISHING**

- A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.

**3.04 TOLERANCES**

- A. Maximum Variation from True Position: 1/16 inch (1.6 mm).
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch (0.79 mm).

**END OF SECTION**





**SECTION 06 4100**  
**ARCHITECTURAL WOOD CASEWORK**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Specially fabricated cabinet units.
- B. Countertops.
- C. Cabinet hardware.
- D. Factory finishing.

**1.02 REFERENCE STANDARDS**

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.
- B. BHMA A156.9 - American National Standard for Cabinet Hardware; 2010.

**1.03 SUBMITTALS**

- A. See Section 01300 - Submittals & Substitutions, for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
- C. Product Data: Provide data for hardware accessories.

**1.04 QUALITY ASSURANCE**

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Protect units from moisture damage.

**1.06 FIELD CONDITIONS**

- A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

**PART 2 PRODUCTS**

**2.01 CABINETS**

- A. Quality Grade: Unless otherwise indicated provide products of quality specified by AWI/AWMAC/WI (AWS) for Custom Grade.
- B. Plastic Laminate Faced Cabinets: Custom Grade.
  - 1. Finish - Exposed Exterior Surfaces: Decorative laminate.
  - 2. Finish - Exposed Interior Surfaces: Solid phenolic.
  - 3. Finish - Concealed Surfaces: Manufacturer's option.
  - 4. Casework Construction Type: Type A - Frameless.
  - 5. Grained Face Layout for Cabinet and Door Fronts: Style and Rail, all Grades.
    - a. Drawer fronts run grain horizontally.
    - b. Doors: Vertical grain.
  - 6. Adjustable Shelf Loading: 50 lbs. per sq. ft.

**2.02 WOOD-BASED COMPONENTS**

- A. Hardwood Edgebanding: Use solid hardwood edgebanding matching species, color, grain, and grade for exposed portions of cabinetry.

**2.03 LAMINATE MATERIALS**

- A. Manufacturers:
  - 1. Formica Corporation: [www.formica.com](http://www.formica.com).
  - 2. Panolam Industries International, Inc\Nevamar: [www.nevamar.com](http://www.nevamar.com).

3. Wilsonart: [www.wilsonart.com](http://www.wilsonart.com).
4. Substitutions: See Section 01300 - Submittals & Substitutions.

## **2.04 COUNTERTOPS**

- A. Plastic Laminate Countertops: Medium density fiberboard substrate covered with HPDL, conventionally fabricated and self-edge banded.

## **2.05 ACCESSORIES**

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Fasteners: Size and type to suit application.
- C. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.
- D. Concealed Joint Fasteners: Threaded steel.

## **2.06 HARDWARE**

- A. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.
- B. Adjustable Shelf Supports: Standard back-mounted system using surface mounted metal shelf standards and coordinated cantilevered shelf brackets, satin chrome finish, for nominal 1 inch (25 mm) spacing adjustments.
- C. Drawer and Door Pulls: "U" shaped wire pull, steel with chrome finish, 4 inch centers ("U" shaped wire pull, steel with chrome finish, 100 mm centers).
- D. Sliding Door Pulls: Circular shape for recessed installation, steel with satin finish.
- E. Hinges: European style concealed self-closing type, steel with polished finish.
  1. Manufacturers:
    - a. Grass America Inc: [www.grassusa.com](http://www.grassusa.com).
    - b. Hardware Resources: [www.hardwareresources.com](http://www.hardwareresources.com).
    - c. Hettich America, LP; Sensys: [www.hettichamerica.com](http://www.hettichamerica.com).
    - d. Julius Blum, Inc: [www.blum.com](http://www.blum.com).
    - e. Substitutions: See Section 01300 - Submittals & Substitutions.
- F. Sliding Door Track Assemblies: Upper and lower track of satin anodized aluminum, with matching shoe equipped with nylon rollers.

## **2.07 FABRICATION**

- A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.
- B. Matching Wood Grain: Comply with requirements of quality standard for specified Grade and as follows:
  1. Provide center matched panels at each elevation.
  2. Provide sequence matching across each elevation.
- C. Provide cutouts for plumbing fixtures. Verify locations of cutouts from on-site dimensions. Prime paint cut edges.

## **2.08 SHOP FINISHING**

- A. Sand work smooth and set exposed nails and screws.
- B. For opaque finishes, apply wood filler in exposed nail and screw indentations and sand smooth.
- C. On items to receive transparent finishes, use wood filler matching or blending with surrounding surfaces and of types recommended for applied finishes.

- D. Finish work in accordance with AWI/AWMAC/WI (AWS), Section 5 - Finishing for grade specified and as follows:
  - 1. Transparent:
    - a. System - 1, Lacquer, Nitrocellulose.
    - b. Sheen: Flat.
  - 2. Opaque:
    - a. System - 1, Lacquer, Nitrocellulose.
    - b. Color: As selected by Architect.
    - c. Sheen: Flat.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify adequacy of backing and support framing.
- B. Verify location and sizes of utility rough-in associated with work of this section.

#### **3.02 INSTALLATION**

- A. Install work in accordance with AWI/AWMAC/WI (AWS) requirements for grade indicated.
- B. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- C. Use fixture attachments in concealed locations for wall mounted components.
- D. Use concealed joint fasteners to align and secure adjoining cabinet units.
- E. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch (0.79 mm). Do not use additional overlay trim for this purpose.
- F. Secure cabinets to floor using appropriate angles and anchorages.
- G. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

#### **3.03 ADJUSTING**

- A. Adjust moving or operating parts to function smoothly and correctly.

#### **3.04 CLEANING**

- A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

### **END OF SECTION**



**SECTION 07 9200**  
**JOINT SEALANTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Nonsag gunnable joint sealants.
- B. Joint backings and accessories.

**1.02 REFERENCE STANDARDS**

- A. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2012.
- B. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.

**1.03 WARRANTY**

- A. See Section 01700 - Contract Closeout, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
  - 1. BASF Construction Chemicals-Building Systems: [www.buildingsystems.basf.com](http://www.buildingsystems.basf.com).
  - 2. Bostik Inc: [www.bostik-us.com](http://www.bostik-us.com).
  - 3. Dow Corning Corporation: [www.dowcorning.com/construction](http://www.dowcorning.com/construction).
  - 4. Hilti, Inc: [www.us.hilti.com](http://www.us.hilti.com).
  - 5. Pecora Corporation: [www.pecora.com](http://www.pecora.com).
  - 6. The QUIKRETE Companies: [www.quikrete.com](http://www.quikrete.com).
  - 7. Tremco Global Sealants: [www.tremcosealants.com](http://www.tremcosealants.com).
  - 8. Sherwin-Williams Company: [www.sherwin-williams.com](http://www.sherwin-williams.com).
  - 9. Sika Corporation: [www.usa-sika.com](http://www.usa-sika.com).
  - 10. W.R. Meadows, Inc: [www.wrmeadows.com](http://www.wrmeadows.com).
  - 11. Substitutions: See Section 01300 - Submittals & Substitutions.

**2.02 JOINT SEALANT APPLICATIONS**

- A. Scope:
  - 1. Interior Joints: Interior joints to be sealed include, but are not limited to, the following items.
    - a. Joints between door, window, and other frames and adjacent construction.
    - b. In sound-rated wall and ceiling assemblies, gaps at electrical outlets, wiring devices, piping, and other openings; between wall/ceiling and other construction; and other flanking sound paths.
    - c. Other joints indicated below.
  - 2. Do not seal the following types of joints.
    - a. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
    - b. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
    - c. Joints where installation of sealant is specified in another section.
- B. Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.
  - 1. Wall and Ceiling Joints in Non-Wet Areas: Acrylic emulsion latex sealant.

2. Wall and Ceiling Joints in Wet Areas: Non-sag polyurethane sealant for continuous liquid immersion.
  3. Joints between Fixtures in Wet Areas and Floors, Walls, and Ceilings: Mildew-resistant silicone sealant; white.
  4. In Sound-Rated Assemblies: Acrylic emulsion latex sealant.
- C. Interior Wet Areas: Bathrooms; fixtures in wet areas include plumbing fixtures, countertops, and other similar items.
- D. Sound-Rated Assemblies: Walls and ceilings identified as "STC-rated", "sound-rated", or "acoustical".

### **2.03 ACCESSORIES**

- A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
- B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
- D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.

### **3.02 PREPARATION**

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

### **3.03 INSTALLATION**

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Perform acoustical sealant application work in accordance with ASTM C919.
- D. Install bond breaker backing tape where backer rod cannot be used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

**END OF SECTION**

**SECTION 08 1113**  
**HOLLOW METAL DOORS AND FRAMES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Non-fire-rated hollow metal doors and frames.
- B. Hollow metal frames for wood doors.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 7100 - Door Hardware.

**1.03 REFERENCE STANDARDS**

- A. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.
- B. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2014.
- C. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.
- D. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; 2007.

**1.04 SUBMITTALS**

- A. See Section 01300 - Submittals & Substitutions, for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Copies of Documents at Project Site: Maintain at the project site a copy of each referenced document that prescribes installation requirements.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Hollow Metal Doors and Frames:
  - 1. Ceco Door, an Assa Abloy Group company: [www.assaabloydss.com](http://www.assaabloydss.com).
  - 2. De La Fontaine Inc: [www.delafontaine.com](http://www.delafontaine.com).
  - 3. Republic Doors: [www.republicdoor.com](http://www.republicdoor.com).
  - 4. Steelcraft, an Allegion brand: [www.allegion.com/us](http://www.allegion.com/us).
  - 5. Technical Glass Products; SteelBuilt Window & Door Systems: [www.tgpamerica.com](http://www.tgpamerica.com).
  - 6. Substitutions: See Section 01300 - Submittals & Substitutions.

**2.02 HOLLOW METAL DOORS**

- A. Interior Doors, Non-Fire Rated:

1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
  - a. Level 1 - Standard-duty.
  - b. Physical Performance Level C, 250,000 cycles; in accordance with ANSI/SDI A250.4.
  - c. Model 1 - Full Flush.
  - d. Door Face Metal Thickness: 20 gage, 0.032 inch (0.8 mm), minimum.
2. Core Material: Manufacturers standard core material/construction and in compliance with requirements.
3. Door Thickness: 1-3/4 inch (44.5 mm), nominal.
4. Door Finish: Factory primed and field finished.

### **2.03 HOLLOW METAL FRAMES**

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Frame Finish: Factory primed and field finished.
- C. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.
  1. Frame Metal Thickness: 18 gage, 0.042 inch (1.0 mm), minimum.
- D. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.

### **2.04 ACCESSORIES**

- A. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.
- B. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

### **2.05 FINISHES**

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

### **3.02 INSTALLATION**

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. Coordinate frame anchor placement with wall construction.
- C. Coordinate installation of hardware.

### **3.03 TOLERANCES**

- A. Maximum Diagonal Distortion: 1/16 in (1.5 mm) measured with straight edge, corner to corner.

### **3.04 ADJUSTING**

- A. Adjust for smooth and balanced door movement.

### **3.05 SCHEDULE**

- A. Refer to Door and Frame Schedule on the drawings.

**END OF SECTION**



## **SECTION 08 3458 VAULT DOORS**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. GSA vault doors.

#### **1.02 REFERENCE STANDARDS**

- A. FS AA-D-600 - Door, Vault, Security; Federal Specification; 2010, Revision D.
- B. FS FF-L-2740 - Locks, Combination; Federal Specification; 1997, Revision A, and Amendment 1.
- C. UL 140 - Standard for Relocking Devices for Safes and Vaults; Underwriters Laboratories; Current Edition, Including All Revisions.
- D. UL 155 - Standard for Tests for Fire Resistance of Vault and File Room Doors; Underwriters Laboratories; Current Edition, Including All Revisions.
- E. UL 768 - Standard for Combination Locks; Underwriters Laboratories; Current Edition, Including All Revisions.

#### **1.03 SUBMITTALS**

- A. See Section 01300 – Submittals & Substitutions, for submittal procedures.
- B. Product Data: Provide manufacturer's data sheets and installation instructions for all major components including locks; include head, jamb, and sill sections; show elevations, clearances, opening dimensions, door size(s), materials, finishes, and construction details.
- C. Shop Drawings: Prepare drawings specifically for this project, showing head, jamb, and sill cross- sections to illustrate dimensional relationship of doors to adjacent construction and floor finishes.
- D. Certificates: Provide written certify that products of this section comply with specified requirements.
- E. Operation and Maintenance Data: Include instructions for lock and emergency egress mechanism.

#### **1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of this type with minimum 3 years of experience.

#### **1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver door and frame assemblies to project site in protective covering with manufacturer and product name clearly marked.
- B. Inspect materials for damage upon delivery. Replace damaged materials.
- C. Store door and frame assemblies under cover, in a dry location free from dust and other contaminants, and elevated above grade.

#### **1.06 WARRANTY**

- A. See Section 01700 - Contract Closeout for additional warranty requirements.
- B. Correct defective Work within a 1 year period after Date of Substantial Completion.

## **PART 2 PRODUCTS**

### **2.01 NON-FIRE-RATED DOORS ("GSA VAULT DOORS")**

- A. Manufacturers:
  - 1. Diebold, Inc: [www.diebold.com](http://www.diebold.com).
  - 2. Hamilton Products Group, Inc: [www.hamiltonproductsgroup.com](http://www.hamiltonproductsgroup.com).
  - 3. Overly Door Company: [www.overly.com](http://www.overly.com).
  - 4. International Vault, Scimitar Vault Door: [www.internationalvault.com](http://www.internationalvault.com).
  - 5. Vanguard International: [www.vanguardii.com](http://www.vanguardii.com).
  - 6. Custom Vault Co.: [www.customvault.com](http://www.customvault.com).
  - 7. Substitutions: See Section 01300 - Submittals and Substitutions.
- B. Armory Vault Doors: Assembly consisting of outswinging double door, frame, sill, hinges, multi-point bolt mechanism, and locks; entire assembly complying with FS AA-D-600 Class 5-V and fabricated as a standard product of a single manufacturer.
  - 1. Bolt Engagement/Disengagement Force: 15 pounds-force (20 Nm), maximum.
  - 2. Swing Force at Operating Handle: 33 pounds-force (45 Nm), maximum.
  - 3. Clear Opening Width - Pair: 96 inches.
  - 4. Clear Opening Height: 96 inches.
  - 5. Rough Wall Opening: 10-1/2 inches (227 mm) wider than clear opening.
  - 6. Door Swing - Pair: Active leaf hinged on left when looking toward vault; outswinging.
- C. Vault Door: Hollow steel.
  - 1. Thickness: Approximately 5 inches (127 mm).
  - 2. Front Face: 0.060 inches (1.5 mm) thick, minimum, riveted to edge faces.
  - 3. Edge and Back Faces: 0.032 inches (0.81 mm) thick, minimum.
  - 4. Hinges: Minimum 3 anti-friction bearing steel hinges per leaf, allowing door to swing open 180 degrees.
  - 5. Optical Device: To permit observation from outside to inside.
  - 6. Door Handles: Satin or polished finish, stainless steel or chrome plated brass or bronze.
  - 7. Steel Finish: Manufacturer's standard textured vinyl paint; manufacturer's standard color.
- D. Locking Mechanism: Multi-point bolts extended into door frame and retracted by handle on outside face of door, with emergency release mechanism on inside; outside handle locked/unlocked by combination lock.
  - 1. Bolts: At least 5 bolts at each jamb, nickel plated and permanently lubricated.
  - 2. Bolt Diameter: 11/16 inch (17 mm), minimum.
  - 3. Combination Lock: Electromechanical type complying with FS FF-L-2740, with key change capability.
  - 4. Combination Lock: Mechanical type complying with UL 768 Class Group 1R.
    - a. Locking Mechanism: 3 tumbler, key change type with metal case, protected by drill-resistant steel plate.
  - 5. Automatic Relocking Device: UL 140 classified, to automatically deadlock bolts in case of tool or torch attack.
  - 6. Signage: Permanently mounted, with instructions for operating emergency release; located on the inside face of the door or nearby.
- E. Frame: Wrap-around hollow steel frame not requiring grouting, designed so that when installed the mounting bolts or other attachment mechanism is accessible only from inside the vault; not more than 1/8 inch (3 mm) clearance between door and frame.
  - 1. Steel: Minimum 0.048 inches (1.2 mm) thick.
  - 2. Jambs and Soffit: Single piece of steel for each length, continuously welded along entire corner intersection.

3. Frame Depth: To fit wall in which it is installed.
4. Frame Depth: To fit 7-5/8 inch (200 mm) thick rough wall.
5. Threshold: Steel, stainless steel, or nickel silver; full width of opening; flat, flush with finished floor or not more than 1/4 inch (6 mm) thick tapered on each side; bolt receptors, if used, must be at least 1/2 inch (12 mm) deep.

## **2.02 DAY GATES**

- A. Day Gate: Swing-in, hinged on same side as vault door; no interference with vault door inner release mechanism; made as part of vault door assembly.
  1. Style: Vault door manufacturer's standard.
  2. Style: Horizontal bars, solid, of satin stainless steel, in frame of same material.
  3. Style: Expanded metal mesh, stainless steel, in frame of same material.
  4. Style: Clear acrylic glazing, single lites, in clear anodized aluminum frame.
  5. Frame: Minimum 3/8 inch (9 mm) by 1-1/4 inch (31 mm) members.
  6. Locking: Manufacturer's standard key lock, always unlocked from inside.
  7. Locking: Standard lever handle cylindrical lockset, self-latching, deadlocking; outside handle controlled by key outside, key allows operation of handle without unlocking handle, key may be used to unlock handle; always unlocked from inside.
  8. Finish: To match vault door unless otherwise indicated.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that wall thickness and rough door opening are constructed correctly and of proper dimensions.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions, conditions of labeling authority and requirements of authorities having jurisdiction, with door and frame mounted plumb and true, securely attached to vault wall construction.
- B. Adjust operating components for proper function, free and smooth operation, and secure locking; partially opened door should remain in position without manual or artificial stops.

### **3.03 PROTECTION**

- A. Protect products from damage until Substantial Completion.
- B. Repair or replace damaged products prior to Substantial Completion.

## **END OF SECTION**



**SECTION 08 7100**  
**DOOR HARDWARE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Hardware for wood and hollow metal doors.

**1.02 REFERENCE STANDARDS**

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- C. BHMA A156.2 - American National Standard for Bored and Preassembled Locks & Latches; 2011.
- D. BHMA A156.4 - American National Standard for Door Controls - Closers; 2013.
- E. BHMA A156.8 - American National Standard for Door Controls - Overhead Stops and Holders; 2010.
- F. BHMA A156.12 - American National Standard for Interconnected Locks; 2013.
- G. BHMA A156.18 - American National Standard for Materials and Finishes; 2012.
- H. BHMA A156.21 - American National Standard for Thresholds; 2014.
- I. BHMA A156.22 - American National Standard for Door Gasketing and Edge Seal Systems, Builders Hardware Manufacturers Association; 2012.
- J. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2014.
- K. BHMA A156.115W - Hardware Preparation in Wood Doors with Wood or Steel Frames; 2006.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the manufacture, fabrication, and installation of products that door hardware will be installed upon.
- B. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.
- C. Convey Owner's keying requirements to manufacturers.

**1.04 SUBMITTALS**

- A. See Section 01300 - Submittals & Substitutions, for submittal procedures.
- B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project.
- C. Hardware Schedule: Detailed listing of each item of hardware to be installed on each door. Use door numbering scheme as included in the Contract Documents. Identify electrically operated items and include power requirements.
- D. Keying Schedule: Submit for approval of Owner.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

### 1.07 WARRANTY

- A. See Section 01700 - Contract Closeout, for additional warranty requirements.
- B. Provide five year warranty for door hardware.

## PART 2 PRODUCTS

### 2.01 DOOR HARDWARE - GENERAL

- A. Provide hardware specified or required to make doors fully functional, compliant with applicable codes, and secure to the extent indicated.
- B. Provide items of a single type of the same model by the same manufacturer.
- C. Provide products that comply with the following:
  - 1. Applicable provisions of federal, state, and local codes.
  - 2. Accessibility: ADA Standards and ICC A117.1.
  - 3. Hardware Preparation for Steel Doors and Steel Frames: BHMA A156.115.
  - 4. Hardware Preparation for Wood Doors with Wood or Steel Frames: BHMA A156.115W.
  - 5. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for the purpose specified and indicated.
- D. Finishes: Provide door hardware of the same finish unless otherwise indicated.
  - 1. Primary Finish: Satin chrome plated over nickel on brass or bronze, 626 (approx US26D).
  - 2. Finish Definitions: BHMA A156.18.
  - 3. Exceptions:
    - a. Where base metal is specified to be different, provide finish that is an appearance equivalent according to BHMA A156.18.

### 2.02 LOCKS AND LATCHES

- A. Locks: Provide a lock for every door, unless specifically indicated as not requiring locking.
  - 1. Hardware Sets indicate locking functions required for each door.
  - 2. If no hardware set is indicated for a swinging door provide an office lockset.
  - 3. Trim: Provide lever handle or pull trim on outside of all locks unless specifically stated to have no outside trim.
  - 4. Lock Cylinders: Provide key access on outside of all locks unless specifically stated to have no locking or no outside trim.
- B. Lock Cylinders: Manufacturer's standard tumbler type, six-pin standard core.
  - 1. Provide cams and/or tailpieces as required for locking devices required.
- C. Keying: Grand master keyed.
  - 1. Key to existing keying system.
    - a. Existing master key system uses Schlage Primus cylinders.
- D. Latches: Provide a latch for every door that is not required to lock, unless specifically indicated "push/pull" or "not required to latch".

### 2.03 HINGES

- A. Hinges: Provide hinges on every swinging door.
  - 1. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
  - 2. Provide ball-bearing hinges at all doors having closers.
  - 3. Provide hinges in the quantities indicated.
  - 4. Provide non-removable pins on exterior outswinging doors.
- B. Manufacturers - Hinges:
  - 1. Assa Abloy Brands; McKinney: [www.assaabloydss.com](http://www.assaabloydss.com).
  - 2. Bommer Industries, Inc: [www.bommer.com](http://www.bommer.com).
  - 3. C. R. Laurence Company, Inc: [www.crl-arch.com](http://www.crl-arch.com).
  - 4. Hager Companies: [www.hagerco.com](http://www.hagerco.com).

5. Stanley Black & Decker: [www.stanleyblackanddecker.com](http://www.stanleyblackanddecker.com).
6. Substitutions: See Section 01300 - Submittals & Substitutions.

## **2.04 CYLINDRICAL LOCKSETS**

- A. Locking Functions: As defined in BHMA A156.2, and as follows.
  1. Privacy: F76, emergency tool unlocks.
  2. Office: F82 Grade 1, key not required to lock, unlocks upon exit.
- B. Manufacturers - Cylindrical Locksets:
  1. Assa Abloy Brands; Corbin Russwin, Sargent, or Yale: [www.assaabloydss.com](http://www.assaabloydss.com).
  2. Hager Companies: [www.hagerco.com](http://www.hagerco.com).
  3. Schlage, an Allegion brand: [www.allegion.com/us](http://www.allegion.com/us).
  4. Substitutions: See Section 01300 - Submittals & Substitutions.

## **2.05 CLOSERS**

- A. Closers: Complying with BHMA A156.4.
  1. Provide surface-mounted, door-mounted closers unless otherwise indicated.
  2. Provide a door closer on every exterior door.
  3. At outswinging exterior doors, mount closer in inside of door.
- B. Manufacturers - Surface Mounted Closers:
  1. Assa Abloy Brands; Corbin Russwin, Norton, Rixson, Sargent, or Yale: [www.assaabloydss.com](http://www.assaabloydss.com).
  2. C. R. Laurence Company, Inc: [www.crl-arch.com](http://www.crl-arch.com).
  3. DORMA USA, Inc; 7400 Series, 8600 Series, 8900 Series, and TS93: [www.dorma.com](http://www.dorma.com).
  4. Hager Companies: [www.hagerco.com](http://www.hagerco.com).
  5. LCN, an Allegion brand: [www.allegion.com/us](http://www.allegion.com/us).
  6. Substitutions: See Section 01300 - Submittals & Substitutions

## **2.06 STOPS AND HOLDERS**

- A. Stops: Complying with BHMA A156.8; provide a stop for every swinging door, unless otherwise indicated.
  1. Provide wall stops, unless otherwise indicated.
  2. If wall stops are not practical, due to configuration of room or furnishings, provide overhead stop.
  3. Stop is not required if positive stop feature is specified for door closer; positive stop feature of door closer is not an acceptable substitute for a stop unless specifically so stated.
- B. Manufacturers - Overhead Holders/Stops:
  1. Assa Abloy Brands; Rixson or Sargent: [www.assaabloydss.com](http://www.assaabloydss.com).
  2. C. R. Laurence Company, Inc: [www.crl-arch.com](http://www.crl-arch.com).
  3. DORMA USA, Inc; 900 Series: [www.dorma.com](http://www.dorma.com).
  4. Glynn-Johnson, an Allegion brand: [www.allegion.com/us](http://www.allegion.com/us).
  5. Substitutions: See Section 01300 - Submittals & Substitutions
- C. Manufacturers - Wall and Floor Stops/Holders:
  1. Assa Abloy Brands; McKinney: [www.assaabloydss.com](http://www.assaabloydss.com).
  2. C. R. Laurence Company, Inc: [www.crl-arch.com](http://www.crl-arch.com).
  3. Hager Companies: [www.hagerco.com](http://www.hagerco.com).
  4. Hiawatha, Inc, division of Activar Construction Products Group, Inc: [www.activarcpg.com/hiawatha](http://www.activarcpg.com/hiawatha).
  5. Trimco Hardware: [www.trimcohardware.com](http://www.trimcohardware.com).
  6. Substitutions: See Section 01300 - Submittals & Substitutions

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that doors and frames are ready to receive work; labeled, fire-rated doors and frames are present and properly installed, and dimensions are as indicated on shop drawings.
- B. Verify that electric power is available to power operated devices and of the correct characteristics.

### **3.02 INSTALLATION**

- A. Install hardware in accordance with manufacturer's instructions and applicable codes.
- B. Use templates provided by hardware item manufacturer.
- C. Mounting heights for hardware from finished floor to center line of hardware item.
- D. Set exterior door thresholds with full-width bead of elastomeric sealant on each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.

### **3.03 ADJUSTING**

- A. Adjust hardware for smooth operation.
- B. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

### **3.04 CLEANING**

- A. Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

## **HARDWARE SETS**

### **4.01 HARDWARE SETS - GENERAL**

- A. These Hardware Sets indicate requirements for single doors of that type, with conditional requirements for pairs and other situations.

### **4.02 VAULT DOOR**

- A. HW-1: All hardware shall be furnished by door supplier.

### **4.03 SWING DOORS -- LOCKABLE, MAY BE LEFT UNLOCKED, KEY NOT REQUIRED TO LOCK**

- A. HW-10: Office, Non-Fire-Rated:
  - 1. Lockset, Office.

**END OF SECTION**



## **SECTION 08 8000 GLAZING**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Glazing units.
- B. Glazing compounds and accessories.

#### **1.02 REFERENCE STANDARDS**

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test; 2010.
- C. ASTM C1036 - Standard Specification for Flat Glass; 2011.
- D. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.
- E. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.
- F. GANA (GM) - GANA Glazing Manual; 2009.
- G. GANA (SM) - GANA Sealant Manual; 2008.

#### **1.03 SUBMITTALS**

- A. See Section 01300 - Submittals and Substitutions.

#### **1.04 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Float Glass Manufacturers:
  - 1. AGC Glass Company North America, Inc: [www.us.agc.com](http://www.us.agc.com).
  - 2. Cardinal Glass Industries: [www.cardinalcorp.com](http://www.cardinalcorp.com).
  - 3. Guardian Industries Corp: [www.sunguardglass.com](http://www.sunguardglass.com).
  - 4. Pilkington North America Inc: [www.pilkington.com/na](http://www.pilkington.com/na).
  - 5. PPG Industries, Inc: [www.ppgideascape.com](http://www.ppgideascape.com).
  - 6. Substitutions: Refer to Section 01300 - Submittals and Substitutions.

#### **2.02 GLASS MATERIALS**

- A. Float Glass: Provide float glass based glazing unless noted otherwise.
  - 1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality-Q3.
  - 2. Heat-Strengthened and Fully Tempered Types: ASTM C1048, Kind HS and FT.
  - 3. Fully Tempered Safety Glass: Complies with ANSI Z97.1 and 16 CFR 1201 criteria.
  - 4. Thicknesses: As indicated on the drawings.

#### **2.03 GLAZING UNITS**

- A. Type G-2 - Monolithic Interior Vision Glazing:
  - 1. Applications: Interior glazing unless otherwise indicated.
  - 2. Glass Type: Annealed float glass.
  - 3. Tint: Clear.
  - 4. Thickness: 1/4 inch (6.4 mm), nominal.
  - 5. Glazing Method: Dry glazing method, gasket glazing.
- B. Type G-5 - Monolithic Safety Glazing: Non-fire-rated.
  - 1. Applications:
    - a. Glazed lites in doors, except fire doors.
    - b. Glazed sidelights to doors, except in fire-rated walls and partitions.

- c. Other locations indicated on the drawings.
- 2. Glass Type: Fully tempered safety glass as specified.
- 3. Tint: Clear.
- 4. Thickness: 1/4 inch (6.4 mm), nominal.
- 5. Glazing Method: Dry glazing method, gasket glazing.

## **2.04 ACCESSORIES**

- A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot (25 mm for each square meter) of glazing or minimum 4 inch (100 mm) x width of glazing rabbet space minus 1/16 inch (1.5 mm) x height to suit glazing method and pane weight and area.
- B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Continuous x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.
- C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.
  - 1. Width: As required for application.
  - 2. Thickness: As required for application.
  - 3. Spacer Rod Diameter: As required for application.
- D. Glazing Tape: Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent, designed for compression of 25 percent to effect an air barrier and vapor retarder seal.
- E. Glazing Clips: Manufacturer's standard type.

## **PART 3 EXECUTION**

### **3.01 VERIFICATION OF CONDITIONS**

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that the minimum required face and edge clearances are being provided.
- C. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.
- D. Verify that sealing between joints of glass framing members has been completed effectively.
- E. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

### **3.02 PREPARATION**

- A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

### **3.03 INSTALLATION, GENERAL**

- A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
- B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.

- D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.
- E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.
- F. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

#### **3.04 CLEANING**

- A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- B. Remove non-permanent labels immediately after glazing installation is complete.
- C. Clean glass and adjacent surfaces after sealants are fully cured.
- D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

#### **3.05 PROTECTION**

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.
- B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

**END OF SECTION**



**SECTION 09 2116**  
**GYPSUM BOARD ASSEMBLIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Performance criteria for gypsum board assemblies.
- B. Acoustic insulation.
- C. Gypsum wallboard.
- D. Joint treatment and accessories.

**1.02 REFERENCE STANDARDS**

- A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.
- B. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2013.
- C. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2014.
- D. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base; 2014a.
- E. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2014.
- F. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2012.
- G. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.
- H. ASTM E413 - Classification for Rating Sound Insulation; 2010.
- I. GA-216 - Application and Finishing of Gypsum Board; 2013.
- J. UL (FRD) - Fire Resistance Directory; current edition.

**1.03 SUBMITTALS**

- A. See Section 01300 - Submittals & Substitutions, for submittal procedures.
- B. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.

**PART 2 PRODUCTS**

**2.01 GYPSUM BOARD ASSEMBLIES**

- A. Provide completed assemblies complying with ASTM C840 and GA-216.
- B. Interior Partitions, Indicated as Acoustic: Provide completed assemblies with the following characteristics:
  - 1. Acoustic Attenuation: STC of 45-49 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.

**2.02 BOARD MATERIALS**

- A. Manufacturers - Gypsum-Based Board:
  - 1. American Gypsum Company: [www.americangypsum.com](http://www.americangypsum.com).
  - 2. CertainTeed Corporation: [www.certainteed.com](http://www.certainteed.com).
  - 3. Continental Building Products: [www.continental-bp.com](http://www.continental-bp.com).
  - 4. Georgia-Pacific Gypsum: [www.gpgypsum.com](http://www.gpgypsum.com).
  - 5. National Gypsum Company: [www.nationalgypsum.com](http://www.nationalgypsum.com).
  - 6. PABCO Gypsum: [www.pabcogypsum.com](http://www.pabcogypsum.com).
  - 7. USG Corporation: [www.usg.com](http://www.usg.com).
  - 8. Substitutions: See Section 01300 - Submittals & Substitutions

- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
  - 1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
  - 2. At Assemblies Indicated with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL or WH listed.
  - 3. Thickness:
    - a. Vertical Surfaces: 5/8 inch (16 mm).
    - b. Ceilings: 5/8 inch (16 mm).

### **2.03 ACCESSORIES**

- A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced.
- B. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.
- C. Beads, Joint Accessories, and Other Trim: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
  - 1. Rigid Corner Beads: Low profile, for 90 degree outside corners and archways.
- D. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that project conditions are appropriate for work of this section to commence.

### **3.02 ACOUSTIC ACCESSORIES INSTALLATION**

- A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- B. Acoustic Sealant: Install in accordance with manufacturer's instructions.
  - 1. Place one bead continuously on substrate before installation of perimeter framing members.
  - 2. Place continuous bead at perimeter of each layer of gypsum board.
  - 3. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.

### **3.03 BOARD INSTALLATION**

- A. Comply with ASTM C 840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.
- C. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.
- D. Cementitious Backing Board: Install over steel framing members and plywood substrate where indicated, in accordance with ANSI A108.11 and manufacturer's instructions.

### **3.04 INSTALLATION OF TRIM AND ACCESSORIES**

- A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

### **3.05 JOINT TREATMENT**

- A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
  - 1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.

- B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
  - 1. Feather coats of joint compound so that camber is maximum 1/32 inch (0.8 mm).

**END OF SECTION**





## **SECTION 09 5100 SUSPENDED ACOUSTICAL CEILINGS**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

#### **1.02 REFERENCE STANDARDS**

- A. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2013a.
- B. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2014.

#### **1.03 SUBMITTALS**

- A. See Section 01300 - Submittals and Substitutions.
- B. Product Data: Provide data on suspension system components.
- C. Samples: Submit two samples 6 by 6 inch in size illustrating material and finish of acoustical units.
- D. Manufacturer's Installation Instructions: Indicate special procedures.

#### **1.04 QUALITY ASSURANCE**

- A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

#### **1.05 FIELD CONDITIONS**

- A. Maintain uniform temperature of minimum 60 degrees F (16 degrees C), and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Acoustic Panels:
  - 1. Armstrong World Industries, Inc; [www.armstrong.com](http://www.armstrong.com).
  - 2. Acoustic Ceiling Products, Inc; [www.acpideas.com](http://www.acpideas.com).
  - 3. CertainTeed Corporation; [www.certainteed.com](http://www.certainteed.com).
  - 4. Hunter Douglas Contract; [www.hunterdouglascontract.com](http://www.hunterdouglascontract.com).
  - 5. USG; [www.usg.com](http://www.usg.com).
  - 6. Substitutions: See Section 01300 - Submittals and Substitutions.
- B. Suspension Systems:
  - 1. Same as for acoustical units.
  - 2. Armstrong World Industries, Inc; [www.armstrong.com](http://www.armstrong.com).
  - 3. Acoustic Ceiling Products, Inc.; [www.acpideas.com](http://www.acpideas.com).
  - 4. CertainTeed Corporation; [www.certainteed.com](http://www.certainteed.com).
  - 5. Hunter Douglas Contract; [www.hunterdouglascontract.com](http://www.hunterdouglascontract.com).
  - 6. Rockfon, LLC; [www.rockfon.com](http://www.rockfon.com).
  - 7. Substitutions: See Section 01300 - Submittal and Substitutions.

#### **2.02 ACOUSTICAL UNITS**

- A. Acoustical Tile Type 1: Painted mineral fiber, ASTM E1264 Type III, with the following characteristics:
  - 1. Size: 24 by 24 inches.
  - 2. Thickness: 5/8 inches (15.9 mm).
  - 3. Edge: Revealed.
  - 4. Surface Color: White.

## **2.03 SUSPENSION SYSTEM(S)**

- A. Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.
- B. Exposed Steel Suspension System Type\_\_\_\_\_: Formed steel, commercial quality cold rolled; heavy-duty.
  - 1. Profile: Tee; 15/16 inch (24 mm) wide face.
  - 2. Finish: White painted.

## **2.04 ACCESSORIES**

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Perimeter Moldings: Same material and finish as grid.
  - 1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
- C. Touch-up Paint: Type and color to match acoustical and grid units.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

### **3.02 INSTALLATION - SUSPENSION SYSTEM**

- A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.
- D. Locate system on room axis according to reflected plan.
- E. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- F. Provide hanger clips during steel deck erection. Provide additional hangers and inserts as required.
- G. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- H. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- I. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- J. Support fixture loads using supplementary hangers located within 6 inches (150 mm) of each corner, or support components independently.
- K. Do not eccentrically load system or induce rotation of runners.
- L. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
  - 1. Use longest practical lengths.
  - 2. Overlap and rivet corners.
- M. Form expansion joints as detailed. Form to accommodate plus or minus 1 inch (25 mm) movement. Maintain visual closure.

### **3.03 INSTALLATION - ACOUSTICAL UNITS**

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Lay directional patterned units with pattern parallel to longest room axis.
- D. Fit border trim neatly against abutting surfaces.

- E. Install units after above-ceiling work is complete.
- F. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- G. Cutting Acoustical Units:
  - 1. Make field cut edges of same profile as factory edges.

#### **3.04 TOLERANCES**

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet (3 mm in 3 m).
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

**END OF SECTION**



**SECTION 09 6500**  
**RESILIENT FLOORING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Resilient tile flooring.
- B. Resilient base.
- C. Installation accessories.

**1.02 REFERENCE STANDARDS**

- A. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile; 2004 (Reapproved 2014).
- B. ASTM F1861 - Standard Specification for Resilient Wall Base; 2008 (Reapproved 2012).

**1.03 SUBMITTALS**

- A. See Section 01300 - Submittals & Substitutions, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01700 - Contract Closeout, for additional provisions.
  - 2. Extra Flooring Material: 25 square feet (3 square meters) of each type and color.
  - 3. Extra Wall Base: 25 linear feet (8 linear meters) of each type and color.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- B. Store all materials off of the floor in an acclimatized, weather-tight space.

**1.05 FIELD CONDITIONS**

- A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F (21 degrees C) to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F (13 degrees C).

**PART 2 PRODUCTS**

**2.01 TILE FLOORING**

- A. Vinyl Composition Tile: Homogeneous, with color extending throughout thickness.
  - 1. Manufacturers:
    - a. Armstrong World Industries, Inc: [www.armstrong.com](http://www.armstrong.com).
    - b. Johnsonite, a Tarkett Company: [www.johnsonite.com](http://www.johnsonite.com).
    - c. Mannington Mills, Inc: [www.mannington.com](http://www.mannington.com).
    - d. Substitutions: See Section 01300 - Submittals & Substitutions
  - 2. Minimum Requirements: Comply with ASTM F1066, of Class corresponding to type specified.
  - 3. Size: 12 by 12 inch (305 by 305 mm).
  - 4. Thickness: 0.125 inch (3.2 mm).
  - 5. Pattern: Marbleized.

**2.02 RESILIENT BASE**

- A. Resilient Base: ASTM F1861, Type TV, vinyl, thermoplastic; top set Style B, Cove.
  - 1. Manufacturers:

- a. Burke Flooring: [www.burkemercer.com](http://www.burkemercer.com).
  - b. Johnsonite, a Tarkett Company: [www.johnsonite.com](http://www.johnsonite.com).
  - c. Roppe Corp: [www.roppe.com](http://www.roppe.com).
  - d. Substitutions: See Section 01300 - Submittals & Substitutions
2. Height: 4 inch (100 mm).
  3. Thickness: 0.125 inch (3.2 mm) thick.
  4. Finish: Satin.
  5. Color: Color as selected from manufacturer's standards.

### **2.03 ACCESSORIES**

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.
- C. Moldings, Transition and Edge Strips: Same material as flooring.
- D. Sealer and Wax: Types recommended by flooring manufacturer.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.

### **3.02 PREPARATION**

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Remove sub-floor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with sub-floor filler to achieve smooth, flat, hard surface.
- C. Prohibit traffic until filler is fully cured.
- D. Clean substrate.

### **3.03 INSTALLATION**

- A. Starting installation constitutes acceptance of sub-floor conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Spread only enough adhesive to permit installation of materials before initial set.
- D. Fit joints and butt seams tightly.
- E. Set flooring in place, press with heavy roller to attain full adhesion.
- F. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
- H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

### **3.04 TILE FLOORING**

- A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.
- B. Lay flooring with joints and seams parallel to building lines to produce symmetrical tile pattern.

**3.05 RESILIENT BASE**

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches (45 mm) between joints.
- B. Scribe and fit to door frames and other interruptions.

**3.06 CLEANING**

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.

**3.07 PROTECTION**

- A. Prohibit traffic on resilient flooring for 48 hours after installation.

**END OF SECTION**





**SECTION 09 6813**  
**TILE CARPETING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Carpet tile, fully adhered.

**1.02 SUBMITTALS**

- A. See Section 01300 - Submittals & Substitutions, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.
- C. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01700 - Contract Closeout, for additional provisions.
  - 2. Extra Carpet Tiles: Quantity equal to 5 percent of total installed of each color and pattern installed.

**1.03 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in installing carpet tile with minimum three years documented experience and approved by carpet tile manufacturer.

**1.04 FIELD CONDITIONS**

- A. Store materials in area of installation for minimum period of 24 hours prior to installation.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Tile Carpeting:
  - 1. Shaw Contract Group
  - 2. Tandus: [www.tandus.com](http://www.tandus.com).
  - 3. Interface, Inc: [www.interfaceinc.com](http://www.interfaceinc.com).
  - 4. Lees Carpets: [www.leescarpets.com](http://www.leescarpets.com).
  - 5. Milliken & Company: [www.milliken.com](http://www.milliken.com).
  - 6. Substitutions: See Section 01300 - Submittals & Substitutions

**2.02 MATERIALS**

- A. Tile Carpeting: Tufted, manufactured in one color dye lot.
  - 1. Product: Chain Stitch Tile manufactured by Shaw Contract Group.
  - 2. Tile Size: 24 by 24 inch, nominal.
  - 3. Color: To be selected.

**2.03 ACCESSORIES**

- A. Sub-Floor Filler: White premix latex; type recommended by flooring material manufacturer.
- B. Edge Strips: Embossed aluminum, color as selected by Architect.
- C. Carpet Tile Adhesive: Recommended by carpet tile manufacturer; releasable type.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that sub-floor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.

- B. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to sub-floor surfaces.
- C. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for flooring installation by testing for moisture and pH.
  - 1. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.

### **3.02 PREPARATION**

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.
- C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.
- D. Vacuum clean substrate.

### **3.03 INSTALLATION**

- A. Starting installation constitutes acceptance of sub-floor conditions.
- B. Install carpet tile in accordance with manufacturer's instructions.
- C. Blend carpet from different cartons to ensure minimal variation in color match.
- D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
- E. Lay carpet tile in square pattern, with pile direction parallel to next unit, set parallel to building lines.
- F. Fully adhere carpet tile to substrate.
- G. Trim carpet tile neatly at walls and around interruptions.
- H. Complete installation of edge strips, concealing exposed edges.

### **3.04 CLEANING**

- A. Remove excess adhesive without damage, from floor, base, and wall surfaces.
- B. Clean and vacuum carpet surfaces.

**END OF SECTION**

**SECTION 09 9123**

**PAINTING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
- D. Do Not Paint or Finish the Following Items:
  - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
  - 2. Items indicated to receive other finishes.
  - 3. Items indicated to remain unfinished.
  - 4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
  - 5. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, and lead items.
  - 6. Floors, unless specifically indicated.
  - 7. Ceramic and other tiles.
  - 8. Glass.
  - 9. Concealed pipes, ducts, and conduits.

**1.02 REFERENCE STANDARDS**

- A. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition, [www.paintinfo.com](http://www.paintinfo.com).

**1.03 SUBMITTALS**

- A. See Section 01300 - Submittals & Substitutions, for submittal procedures.
- B. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
  - 1. Where sheen is specified, submit samples in only that sheen.
- C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01700 - Contract Closeout, for additional provisions.
  - 2. Extra Paint and Finish Materials: 1 gallon (4 L) of each color; from the same product run, store where directed.
  - 3. Label each container with color in addition to the manufacturer's label.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

**1.05 FIELD CONDITIONS**

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Provide paints and finishes from the same manufacturer to the greatest extent possible.
- B. Paints:
  - 1. Benjamin Moore & Co: [www.benjaminmoore.com](http://www.benjaminmoore.com).
  - 2. Diamond Vogel Paints: [www.diamondvogel.com](http://www.diamondvogel.com).
  - 3. PPG Paints: [www.ppgpaints.com](http://www.ppgpaints.com).
  - 4. Pratt & Lambert Paints: [www.prattandlambert.com](http://www.prattandlambert.com).
  - 5. Sherwin-Williams Company: [www.sherwin-williams.com](http://www.sherwin-williams.com).
  - 6. Valspar Corporation: [www.valsparpaint.com](http://www.valsparpaint.com).
- C. Transparent Finishes:
  - 1. Behr Process Corporation: [www.behr.com](http://www.behr.com).
  - 2. Sherwin-Williams Company: [www.sherwin-williams.com](http://www.sherwin-williams.com).
- D. Primer Sealers: Same manufacturer as top coats.
- E. Substitutions: See Section 01300 - Submittals & Substitutions

### **2.02 PAINTS AND FINISHES - GENERAL**

- A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
  - 1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
  - 2. Supply each paint material in quantity required to complete entire project's work from a single production run.
  - 3. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Flammability: Comply with applicable code for surface burning characteristics.
- C. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.
- D. Colors: To be selected from manufacturer's full range of available colors.
  - 1. Selection to be made by Architect after award of contract.

### **2.03 PAINT SYSTEMS - INTERIOR**

- A. Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board and wood.
  - 1. Two top coats and one coat primer.
  - 2. Top Coat(s): High Performance Architectural Interior Latex; MPI #138, 139, 140, or 141.
  - 3. Top Coat Sheen:
    - a. Satin: MPI gloss level 4; use this sheen for items subject to frequent touching by occupants, including door frames and railings.
  - 4. Primer: As recommended by top coat manufacturer for specific substrate.
- B. Transparent Finish on Concrete Floors.
  - 1. 2 coats sealer.
  - 2. Sealer: Water Based for Concrete Floors; MPI #99.
    - a. Products:
      - 1) Behr Premium Wet-Look Sealer High Gloss [No. 985]. (MPI #99)

### **2.04 PRIMERS**

- A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.
  - 1. Interior Institutional Low Odor/VOC Primer Sealer; MPI #149.

- a. Products:
  - 1) PPG Paints Pure Performance Interior Latex Primer, 9-900.
  - 2) Pratt & Lambert Pro-Hide Gold Interior Latex Zero VOC Primer. (MPI #149)
  - 3) Rodda Roseal II, 502701. (MPI #149)
  - 4) Valspar Professional Interior Latex Zero VOC Primer, No. 11286. (MPI #149)
  - 5) Substitutions: See Section 01300 - Submittals & Substitutions

## **2.05 ACCESSORY MATERIALS**

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.
- B. Patching Material: Latex filler.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

### **3.02 PREPARATION**

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Concrete Floors and Traffic Surfaces: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
- F. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.
- G. Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.

### **3.03 APPLICATION**

- A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- C. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- D. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.
- E. Sand wood and metal surfaces lightly between coats to achieve required finish.
- F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- G. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- H. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

**3.04 CLEANING**

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

**3.05 PROTECTION**

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

**END OF SECTION**

**SECTION 22 0100**  
**PLUMBING GENERAL REQUIREMENTS**

**PART 1 - GENERAL**

**1.01 APPLICABILITY**

- A. The work covered by the Division of the Specifications consists of furnishing all labor, supervision, equipment, materials, all incidentals, related items and appurtenances, and performing all operations necessary to complete the installation of work in strict accordance with these specifications and drawings.
- B. All work shall be finished, tested, and ready for operation. The word "Provide" shall mean "furnish and install complete and ready for use".

**1.02 DRAWINGS:**

- A. The drawings indicate the extent and general layout of the mechanical systems intended for the building. Because of the small scale of the drawings, it is not possible to indicate all offsets, fittings, connections, and accessories which may be required. Furnish offsets, fittings, valves, and accessories as may be required, to produce a complete and operating installation of type shown and specified.
- B. Mechanical drawings are diagrammatic in nature and should not be scaled to obtain dimensions. Obtain dimensions and locations of partitions, walls, etc., from the Architectural dimensioned drawings. Consult the Architectural drawings for details of construction, location of suspended ceilings, ceiling heights, and other pertinent information. Architect's drawings shall not take precedence over field measurements.
- C. All drawings and specifications shall be considered in bidding. The drawings and specifications are complimentary, and what is called for in either of these shall be as binding as though called for by both. Should any conflict arise between drawings and specifications, such conflict shall be brought to the attention of the Architect.

**1.03 APPROVED MANUFACTURERS**

- A. Where approved manufacturers are indicated in the specifications, the approval does not relieve the responsibility of the contractor to provide products and systems which meet the requirements of the specifications and drawings.
- B. Performance, dimensions, electrical requirements, and functions shall be coordinated with the basis of design indicated on the drawings and in the specifications. If there are differences from the basis of design they should be brought to the attention of the Engineer.
- C. Revisions required by the differences from basis of design, shall be provided to the Owner without additional cost. Revisions to the work of other contractors on the project, due to differences in equipment, shall be provided by the contractor supplying the equipment at no additional cost to the Owner.

**1.04 INSTRUCTION OF OWNER'S EMPLOYEES:**

- A. Furnish, without additional expense to the Owner, the services of competent instructors, who will give full instructions in the care, adjustment, and operation of all parts of the mechanical equipment to the Owner's employees who are to have charge of the equipment.
- B. An operating and maintenance manual shall be made available to the Owner's operating personnel during the instruction and left with the Owner upon completion of the instruction.
- C. The number of man hours of instruction furnished for each system shall be as specified in other sections of this specification. Hours of instruction shall be divided up into a minimum of two (2) instruction periods.

**1.05 INSTALLATION OF EQUIPMENT:**

- A. All appliances and equipment shall be installed and connected in accordance with manufacturer's instructions and recommendations unless such instructions are in conflict with these specifications.

- B. All equipment shall be installed in such a manner and location as to facilitate accessibility for maintenance and/or replacement.
- C. As a part of the work of this contract, the Contractor shall make any changes in the pulleys, belts, and dampers, and shall install additional dampers required for correct balance as recommended by air balance agency, at no additional cost to the Owner.

**1.06 COOPERATION WITH OTHER TRADES:**

- A. Cooperate with other trades so as to avoid interferences. Where required to avoid interferences with other work or to increase the headroom, the Contractor shall off-set the piping and/or re-route the duct work where directed by the Engineer. Carefully check all construction details to assure the proper installation of all work under this specification. Schedule the work such that it will keep pace with the work of other crafts and cause no delay.

**1.07 INSPECTION OF SITE:**

- A. Before submitting a proposal on the work contemplated in these specifications and accompanying drawings, each bidder shall examine the site and familiarize himself with all of the existing conditions and limitations. No extras will be allowed because of Contractor's misunderstanding as to the amount of work involved or lack of his knowledge of any condition in connection with the new construction.

**1.08 CODES, ORDINANCES, REGULATIONS, & STANDARDS:**

- A. The entire installation shall be made in accordance with all state and local laws. If, in any instance, the plans and specifications conflict with such laws, the law shall take precedence. This, however, shall not be construed as relieving the contractor from complying with any requirements of the drawings and specifications that may be in excess of the rules and not contrary to the same.
- B. All work shall conform to applicable state and local codes, ordinances, regulations, and/or standards.

**PART 2 - PRODUCTS**

**2.01 SUPPORTING STEEL, ROOF AND WALL OPENINGS:**

- A. Provide structural steel framework for supporting mechanical equipment as required.
- B. Unless otherwise indicated by the drawings, lintels for new mechanical openings shall be provided by the contractor installing the pipe.
- C. Unless otherwise indicated by the drawings, angles to frame a new roof opening through the roof deck shall be provided by the contractor installing the pipe through the roof.
- D. All steel work shall be in conformance with the requirement of the AISC Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings. Material shall conform to ASTM A36.

**2.02 SLEAVES, CUTTING, AND CORE DRILLING:**

- A. Provide sleeves for piping openings in masonry walls.
- B. The contractor shall saw cut or core drill existing masonry floors and walls for new piping penetrations. The contractor shall cut new openings through framed walls for piping penetrations. Provide headers as needed in frame walls.

**2.03 FIRESTOPPING**

- A. Provide firestopping assemblies for the required fire ratings and listed in the current year certification books of UL, FM or ITS (Warnock Hersey).
- B. See the Architectural drawings for required ratings. Refer to the Mechanical drawings for additional ratings. Provide firestopping for all penetrations of these assemblies.



## **2.04 SEALING PENETRATIONS IN NON-RATED WALLS AND FLOORS**

- A. Provide caulk at penetrations of non-rated walls and floors for piping. If the gap is too large for caulk, provide fiberglass insulation for backing. Conceal the fiberglass with either caulk or sheetmetal. Refer to specifications for sleeve requirements.
- B. In mechanical rooms and other water-proof floor areas, provide sleeves or concrete pads at least 2" higher than the top of slab to prevent water from running through the annular space between the pipe and the floor opening. In addition to the sleeve, provide packing and caulking around the pipe inside the sleeve to prevent noise transmission through openings in the floor.

## **2.05 ACCESS DOORS IN CEILINGS AND WALLS**

- A. Provide access doors in gypsum board ceilings and walls where needed for access to dampers or valves. Coordinate the installation of the access doors with the ceiling contractor. Confirm the location of the panels with the Architect.

## **2.06 TRENCHING, BACKFILL AND COMPACTION**

- A. Provide trenching, backfill and compaction for buried plumbing systems. Refer to Divisions 1 and 31 specifications for requirements.
- B. As a minimum requirement, the fill shall be either subsoil excavated on-site or engineered fill. The fill shall be free of lumps larger than 3 inches, rocks larger than 2 inches, frozen or spongy and wet material not capable of compaction in place.

# **PART 3 - EXECUTION**

## **3.01 FIRESTOPPING INSTALLATION**

- A. Verify openings are ready to receive the firestopping. Modify the openings as required to accommodate the requirements for the certified assembly drawing for the firestopping material.
- B. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter that could adversely affect bond of firestopping material.
- C. Remove incompatible materials that could adversely affect bond.

## **3.02 TRENCHING, BACKFILL AND COMPACTION**

- A. Compact to minimum of 95 percent of maximum dry density. Cut out soft areas and backfill. Do not fill with frozen materials. Place and compact in layers not exceeding 8 inches compacted depth. Correct areas that are over-excavated. Maintain moisture content of fill materials to obtain compaction density.

**END OF SECTION**



**SECTION 22 0110  
PLUMBING DEMOLITION**

**PART 1 - GENERAL**

**1.01 DESCRIPTION:**

- A. Contract documents and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections apply to this section.
- B. This section specifies the demolition and removal of all plumbing equipment and distribution conduits including but not limited to piping, controls, insulation, plumbing fixtures and accessories in existing building.
- C. Unless otherwise noted in the Documents, all salvage items removed in connection with this Contract are to become the property of the Contractor, however the Owner shall have the first right of refusal on all equipment removed.

**1.02 SUBMITTALS:**

- A. Proposed Dust Control and Noise Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.
- B. Schedule of selective demolition activities:
  - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
  - 2. Interruption of building utility services.
  - 3. Coordination for shutoff, capping and continuation of services.
  - 4. Coordination of Owner's continued occupancy of portions of existing building and of Owner's occupancy of completed work.
- C. Pre-demolition photographs or videotape showing existing pre-demolition conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by selective demolition operations. Submit before demolition work begins.

**1.03 PROJECT CONDITIONS:**

- A. Owner will occupy portions of the building immediately adjacent to selective demolition area. Conduct demolition so Owner's operation will not be disturbed. Provide not less than 48 hours notice to Owner of activities that will affect the Owner's operations.
- B. Maintain existing services to Owner occupied areas during demolition if possible or coordinate interruption of services prior to demolition.
- C. Owner assumes no responsibility for condition of area to be selectively demolished.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
- E. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify the Owner. Hazardous materials will be removed by Owner under a separate contract.

**PART 2 - PRODUCTS**

**2.01 MATERIALS:**

- A. Materials and equipment for patching and extending work: As specified in individual Sections.

**PART 3 - EXECUTION**

**3.01 EXAMINATION:**

- A. Verify field measurements and piping arrangements are as shown on Drawings.
- B. Verify that abandoned equipment serves only abandoned facilities.
- C. Demolition drawings are based on causal field observation and existing record documents. The demolition Drawings are diagrammatic and show the general scope of demolition work and do

not show all the construction detail of the original record drawings. Report discrepancies to the Project Engineer before disturbing existing installation.

- D. The Contractor shall visit the existing building and ground and review the existing building record drawings for details of existing installation to familiarize himself with existing conditions prior to submitting bid. No allowance will be made subsequently, in this connection, on behalf of the contractor for any error or negligence on his part.
- E. Beginning of demolition means the Contractor accepts existing conditions.

### **3.02 PREPARATION:**

- A. Disconnect utilities in areas scheduled for removal. Notify Project Engineer and Owner of areas to be affected by plumbing demolition work prior to commencing.

### **3.03 SELECTIVE DEMOLITION AND EXTENSION OF EXISTING PLUMBING WORK:**

- A. Demolish and remove from site, and extend existing mechanical work under provisions of this Division and as indicated on the Drawings unless otherwise noted.
- B. Salvage items noted to remain the property of the Owner shall be delivered to a location to be designated by the Owner. Contractor shall remove from construction areas all trash or debris as it accumulates and dispose of it off site at no additional cost to the Owner. All construction areas shall be kept clean, safe, and orderly at all times. At the completion and acceptance for work, Contractor shall remove from the site all debris and surplus materials resulting from this work and dispose of them off site at no additional cost to the Owner.
- C. Do not use cutting torches until work area is clear of flammable materials. At concealed spaces verify condition and contents of hidden space before starting flame cutting operations. Maintain Fire Watch and portable fire-suppression devices during flame-cutting operations. Maintain and evaluate ventilation during flame-cutting operations.
- D. Maintain ventilation for dust control during selective demolition process. Verify Owner requirements for dust control and conform to their standards for all demolition activities.
- E. Remove, relocate, and extend existing installations to accommodate new construction as required for proper installation and system operation.
- F. Remove all accessories above grade. When removing equipment or devices all associated pipe, wiring, etc. shall be removed and capped as required. Cut piping, tubing, etc. behind walls, above ceilings and below floors, and patch surfaces to match existing conditions. Finishes will be by others unless otherwise noted in documents.
- G. Neatly cut openings and holes plumb, square and true to dimension required. Use cutting methods least likely to damage construction to remain or adjoining construction. Cut and drill from exposed surfaces into concealed surfaces to avoid marring or spalling of finished surfaces. Temporarily cover openings to remain.
- H. Patch all openings created by removal of plumbing equipment, pipes, etc. unless noted as being patched by others. Openings to be patched to match existing with similar material and finish unless otherwise noted.
- I. Seal all existing roof penetrations, which will not be reused. Roof patching shall be the responsibility of the contractor.
- J. Remove, relocate or provide brackets, hangers, and other accessories as required.
- K. Repair adjacent construction and finished damaged during demolition and extension work.
- L. Maintain access to existing mechanical installations, which remain active.

### **3.04 CLEANING AND REPAIR:**

- A. Clean and repair existing materials and equipment, which remain or are to be returned to the Owner.

- B. All building surfaces damaged and openings left by new Work or the removal or relocation of plumbing equipment, piping, etc., shall be repaired to original condition and painted by the Contractor.

**END OF SECTION**



**SECTION 22 0719**  
**PLUMBING PIPING INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Piping insulation.
- B. Jackets and accessories.

**1.02 REFERENCE STANDARDS**

- A. ASTM C177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus; 2013.
- B. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2016.
- C. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2015.
- D. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2016a.
- E. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2015b.
- F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2016.
- G. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- H. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

**1.03 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum five years of experience.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

**1.05 FIELD CONDITIONS**

- A. Maintain ambient conditions required by manufacturers of each product.
- B. Maintain temperature before, during, and after installation for minimum of 24 hours.

**PART 2 PRODUCTS**

**2.01 REGULATORY REQUIREMENTS**

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

**2.02 GLASS FIBER**

- A. Manufacturers:
  - 1. CertainTeed Corporation: [www.certainteed.com](http://www.certainteed.com).
  - 2. Johns Manville Corporation: [www.jm.com](http://www.jm.com).
  - 3. Knauf Fiber Glass: [www.knaufusa.com](http://www.knaufusa.com).
  - 4. Owens Corning Corporation: [www.ocbuildingspec.com](http://www.ocbuildingspec.com).
- B. Insulation: ASTM C547 and ASTM C795; semi-rigid, noncombustible, end grain adhered to jacket.
  - 1. 'K' Value: ASTM C177, 0.24 at 75 degrees F.
  - 2. Maximum Service Temperature: 650 degrees F.
  - 3. Maximum Moisture Absorption: 0.2 percent by volume.

- C. Vapor Barrier Jacket: White Kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.

### **2.03 FLEXIBLE ELASTOMERIC CELLULAR INSULATION**

- A. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 3; use molded tubular material wherever possible.
  - 1. Minimum Service Temperature: Minus 40 degrees F.
  - 2. Maximum Service Temperature: 220 degrees F.
  - 3. Connection: Waterproof vapor barrier adhesive.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that piping has been tested before applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with North American Insulation Manufacturers Association (NAIMA) National Insulation Standards.
- C. Exposed Piping: Locate insulation and cover seams in least visible locations.
- D. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
- E. Glass fiber insulated pipes conveying fluids below ambient temperature:
  - 1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
  - 2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.
- F. Glass fiber insulated pipes conveying fluids above ambient temperature:
  - 1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples.
  - 2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
- G. Inserts and Shields:
  - 1. Application: Piping 1-1/2 inches diameter or larger.
  - 2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
  - 3. Insert Location: Between support shield and piping and under the finish jacket.
  - 4. Insert Configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
  - 5. Insert Material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.
- H. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions.

### **3.03 SCHEDULES**

- A. Plumbing Systems:
  - 1. Plumbing Vents Within 10 Feet of the Exterior:
    - a. Glass Fiber Insulation:
      - 1) All sizes: 1 inch
  - 2. Condensate Drains from Cooling Coils:



- a. Glass Fiber or Flexible Elastomeric
  - 1) All sizes:1 inch

**END OF SECTION**



## **SECTION 22 1005 PLUMBING PIPING**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Pipe, pipe fittings, specialties, and connections for piping systems.
  - 1. Sanitary sewer.
  - 2. Equipment drains and overflows.
  - 3. Flanges, unions, and couplings.
  - 4. Pipe hangers and supports.

#### **1.02 REFERENCE STANDARDS**

- A. ASME B31.9 - Building Services Piping; 2014.
- B. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2012.
- C. ASTM D2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings; 2014.
- D. ASTM D2855 - Standard Practice for the Two-Step (Primer & Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets; 2015.
- E. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2015.
- F. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications; 2009 (Revised 2012).
- G. CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications; 2011 (Revised 2012).
- H. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2009.
- I. MSS SP-69 - Pipe Hangers and Supports - Selection and Application; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.; 2003.
- J. NSF 61 - Drinking Water System Components - Health Effects; 2014 (Errata 2015).
- K. NSF 372 - Drinking Water System Components - Lead Content; 2011.

#### **1.03 SUBMITTALS**

- A. Project Record Documents: Record actual locations of valves.

#### **1.04 QUALITY ASSURANCE**

- A. Valves: Manufacturer's name and pressure rating marked on valve body.
- B. Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.

#### **1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary protective coating on cast iron and steel valves.
- C. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

#### **1.06 FIELD CONDITIONS**

- A. Do not install underground piping when bedding is wet or frozen.

## **PART 2 PRODUCTS**

### **2.01 GENERAL REQUIREMENTS**

- A. Potable Water Supply Systems: Provide piping, pipe fittings, and solder and flux (if used), that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.

### **2.02 SANITARY SEWER PIPING, BURIED WITHIN 5 FEET OF BUILDING**

- A. PVC Pipe: ASTM D 2665
  - 1. Fittings: PVC.
  - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

### **2.03 SANITARY SEWER PIPING, ABOVE GRADE**

- A. Cast Iron Pipe: CISPI 301, hubless, service weight.
  - 1. Fittings: Cast iron.
  - 2. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.
- B. PVC Pipe: ASTM D2665.
  - 1. Fittings: PVC.
  - 2. Joints: Solvent welded, with ASTM D2564 solvent cement.

### **2.04 EQUIPMENT DRAINS AND OVERFLOWS**

- A. Copper Tube: ASTM B 88 (ASTM B 88M), Type L (B), drawn; using one of the following joint types:
  - 1. Solder Joints: ASME B16.18 cast brass/bronze or ASME B16.22 solder wrought copper fittings; ASTM B 32 lead-free solder, alloy Sn50 solder.
- B. PIPE SIZES SHOWN ON PLANS ARE MINIMUM REQUIRED PIPE SIZES. CONTRACTOR SHALL UPSIZE PIPING TO MATCH DRAIN PAN CONNECTION AS REQUIRED. CONDENSATE PIPING SHALL NOT BE DOWNSIZED FROM DRAIN PAN CONNECTION TO DRAIN.

### **2.05 FLANGES, UNIONS, AND COUPLINGS**

- A. Unions for Pipe Sizes 3 Inches and Under:
  - 1. Ferrous pipe: Class 150 malleable iron threaded unions.
  - 2. Copper tube and pipe: Class 150 bronze unions with soldered joints.
- B. Flanges for Pipe Size Over 1 Inch:
  - 1. Ferrous Pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.
  - 2. Copper Tube and Pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.
- C. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

### **2.06 PIPE HANGERS AND SUPPORTS**

- A. Provide hangers and supports that comply with MSS SP-58.
  - 1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
  - 2. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
  - 3. Trapeze Hangers: Welded steel channel frames attached to structure.
  - 4. Vertical Pipe Support: Steel riser clamp.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that excavations are to required grade, dry, and not over-excavated.

### **3.02 PREPARATION**

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

### 3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- C. Provide access panels where valves and fittings are not exposed. .
- D. PVC solvent welded joints shall be made using a primer of contrasting color.
- E. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- F. Install piping to maintain headroom, conserve space, and not interfere with use of space.
- G. Group piping whenever practical at common elevations.
- H. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- I. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
- J. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
- K. Provide support for utility meters in accordance with requirements of utility companies.
- L. Install bell and spigot pipe with bell end upstream.
- M. Install valves with stems upright or horizontal, not inverted. Refer to Section 22 0523.
- N. Install water piping to ASME B31.9.
- O. PVC Pipe: Make solvent-welded joints in accordance with ASTM D2855.
- P. Inserts:
  - 1. Provide inserts for placement in concrete formwork.
  - 2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
  - 3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
  - 4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
  - 5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut above slab.
- Q. Pipe Hangers and Supports:
  - 1. Install in accordance with MSS SP-58.
  - 2. Hanger spacing and application shall be in accordance with MSS SP-69.
  - 3. Provide oversized hangers on insulated pipe to allow insulation at full thickness to be provided on the piping.
  - 4. Support horizontal piping as scheduled.
  - 5. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
  - 6. Place hangers within 12 inches of each horizontal elbow.
  - 7. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
  - 8. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.
  - 9. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
  - 10. Provide copper plated hangers and supports for copper piping.
  - 11. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

12. Support cast iron drainage piping at every joint.

**3.04 APPLICATION**

- A. Install unions downstream of valves and at equipment or apparatus connections.
- B. Install gate or ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

**3.05 TOLERANCES**

- A. Drainage Piping: Establish invert elevations within 1/2 inch vertically of location indicated and slope to drain at minimum of 1/4 inch per foot slope for pipes 3 inches and smaller. Slope to drain at a minimum of 1/8 inch per foot slope for pipe 4 inches and larger.

**3.06 PRESSURE TESTING OF PLUMBING PIPING SYSTEMS**

- A. Pressure test all plumbing piping systems in accordance with the Plumbing and Fuel Gas Code.

**END OF SECTION**

**SECTION 22 1006**  
**PLUMBING PIPING SPECIALTIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Drains.
- B. Cleanouts.

**1.02 REFERENCE STANDARDS**

- A. ASME A112.6.3 - Floor and Trench Drains; 2001 (R2007).
- B. ASME A112.6.4 - Roof, Deck, and Balcony Drains; 2008 (Reaffirmed 2012).
- C. ASSE 1011 - Hose Connection Vacuum Breakers; 2004.
- D. NSF 61 - Drinking Water System Components - Health Effects; 2014 (Errata 2015).
- E. NSF 372 - Drinking Water System Components - Lead Content; 2011.

**1.03 SUBMITTALS**

- A. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.
- B. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.

**1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years documented experience.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Accept specialties on site in original factory packaging. Inspect for damage.

**1.06 EXTRA MATERIALS**

- A. Supply for Owner's use in maintenance of project:
  - 1. Two loose keys for outside hose bibbs.

**PART 2 PRODUCTS**

**2.01 GENERAL REQUIREMENTS**

- A. Specialties in Potable Water Supply Systems: Provide products that comply with NSF 61 and NSF 372 for maximum lead content.

**2.02 DRAINS**

- A. Manufacturers:
  - 1. Jay R. Smith Manufacturing Company: [www.jayrsmith.com](http://www.jayrsmith.com).
  - 2. Josam Company: [www.josam.com](http://www.josam.com).
  - 3. Wade: [www.wadedrains.com](http://www.wadedrains.com).
  - 4. Watts: [www.watts.com](http://www.watts.com).
  - 5. Zurn Industries, LLC: [www.zurn.com](http://www.zurn.com).
  - 6. Mifab
- B. Floor Drain (FD-1)
  - 1. Zurn Z415I.
  - 2. Description: Cast iron body with bottom outlet, combination invertible membrane clamp, adjustable collar, and seepage slots. Provide with polished nickel bronze strainer with raised flange. Install so top of raised flange is even with the finished floor and the strainer is recessed below the floor.

**2.03 CLEANOUTS**

- A. Manufacturers:
  - 1. Jay R. Smith Manufacturing Company: [www.jayrsmith.com](http://www.jayrsmith.com).
  - 2. Josam Company: [www.josam.com](http://www.josam.com).

3. Wade: [www.wadedrains.com](http://www.wadedrains.com).
  4. Watts: [www.watts.com](http://www.watts.com).
  5. Zurn Industries, LLC: [www.zurn.com](http://www.zurn.com).
- B. Cleanout (CO):
1. Model: Zurn ZN1400.
  2. Description: Adjustable floor cleanout, cast iron body.
  3. Cover: Round, Polished Nickel Bronze finish.

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.
- C. Install floor cleanouts at elevation to accommodate finished floor.

**END OF SECTION**



**SECTION 23 0100**  
**HVAC GENERAL REQUIREMENTS**

**PART 1 - GENERAL**

**1.01 APPLICABILITY**

- A. The work covered by the Division of the Specifications consists of furnishing all labor, supervision, equipment, materials, all incidentals, related items and appurtenances, and performing all operations necessary to complete the installation of work in strict accordance with these specifications and drawings.
- B. All work shall be finished, tested, and ready for operation. The word "Provide" shall mean "furnish and install complete and ready for use".

**1.02 DRAWINGS:**

- A. The drawings indicate the extent and general layout of the mechanical systems intended for the building. Because of the small scale of the drawings, it is not possible to indicate all offsets, fittings, connections, and accessories which may be required. Furnish offsets, fittings, valves, and accessories as may be required, to produce a complete and operating installation of type shown and specified.
- B. Mechanical drawings are diagrammatic in nature and should not be scaled to obtain dimensions. Obtain dimensions and locations of partitions, walls, etc., from the Architectural dimensioned drawings. Consult the Architectural drawings for details of construction, location of suspended ceilings, ceiling heights, and other pertinent information. Architect's drawings shall not take precedence over field measurements.
- C. All drawings and specifications shall be considered in bidding. The drawings and specifications are complimentary, and what is called for in either of these shall be as binding as though called for by both. Should any conflict arise between drawings and specifications, such conflict shall be brought to the attention of the Architect.

**1.03 APPROVED MANUFACTURERS**

- A. Requests for substitution of materials and/or equipment other than those named in the specifications may be made to the Engineer. The request shall be made in duplicate and shall include a request for approval or substitution, pre-addressed, postage pre-paid envelope and information relating to the suitability of the product. No requests by fax. Requests shall be in the Engineer's office not later than ten (10) days prior to Bid Date. Addenda will publish the approved requests.
- B. Where approved manufacturers are indicated in the specifications, the approval does not relieve the responsibility of the contractor to provide products and systems which meet the requirements of the specifications and drawings.
- C. Performance, dimensions, electrical requirements, and functions shall be coordinated with the basis of design indicated on the drawings and in the specifications. If there are differences from the basis of design they should be brought to the attention of the Engineer.
- D. Revisions required by the differences from basis of design, shall be provided to the Owner without additional cost. Revisions to the work of other contractors on the project, due to differences in equipment, shall be provided by the contractor supplying the equipment at no additional cost to the Owner.

**1.04 INSTRUCTION OF OWNER'S EMPLOYEES:**

- A. Furnish, without additional expense to the Owner, the services of competent instructors, who will give full instructions in the care, adjustment, and operation of all parts of the mechanical equipment to the Owner's employees who are to have charge of the equipment.
- B. An operating and maintenance manual shall be made available to the Owner's operating personnel during the instruction and left with the Owner upon completion of the instruction.

- C. The instruction furnished for each system shall be as specified in other sections of this specification. Have the Owner's employees sign a statement that they were present for the training session. Submit a copy of the sign-in sheet with close-out documents.

**1.05 INSTALLATION OF EQUIPMENT:**

- A. All appliances and equipment shall be installed and connected in accordance with manufacturer's instructions and recommendations unless such instructions are in conflict with these specifications.
- B. All equipment shall be installed in such a manner and location as to facilitate accessibility for maintenance and/or replacement.
- C. As a part of the work of this contract, the Contractor shall make any changes in the pulleys, belts, and dampers, and shall install additional dampers required for correct balance as recommended by air balance agency, at no additional cost to the Owner.

**1.06 COOPERATION WITH OTHER TRADES:**

- A. Cooperate with other trades so as to avoid interferences. Where required to avoid interferences with other work or to increase the headroom, the Contractor shall off-set the piping and/or re-route the duct work where directed by the Engineer. Carefully check all construction details to assure the proper installation of all work under this specification. Schedule the work such that it will keep pace with the work of other crafts and cause no delay.

**1.07 INSPECTION OF SITE:**

- A. Before submitting a proposal on the work contemplated in these specifications and accompanying drawings, each bidder shall examine the site and familiarize himself with all of the existing conditions and limitations. No extras will be allowed because of Contractor's misunderstand as to the amount of work involved or lack of his knowledge of any condition in connection with the new construction.

**1.08 CODES, ORDINANCES, REGULATIONS, & STANDARDS:**

- A. The entire installation shall be made in accordance with all state and local laws. If, in any instance, the plans and specifications conflict with such laws, the law shall take precedence. This, however, shall not be construed as relieving the contractor from complying with any requirements of the drawings and specifications that may be in excess of the rules and not contrary to the same.
- B. All work shall conform to applicable state and local codes, ordinances, regulations, and/or standards.

**1.09 TRENCHING, BACKFILL AND COMPACTION**

- A. Provide trenching, backfill and compaction for buried mechanical systems. Refer to Divisions 1 and 31 specifications for requirements.
- B. As a minimum requirement, the fill shall be either subsoil excavated on-site or engineered fill. The fill shall be free of lumps larger than 3 inches, rocks larger than 2 inches, frozen or spongy and wet material not capable of compaction in place.

**PART 2 - PRODUCTS**

**2.01 MECHANICAL ANCHORS TO CONCRETE**

- A. Anchors shall have current ICC-ES report that demonstrates compliance with ACI 355.2 supplemented by ICC-ES AC 193.

**2.02 SUPPORTING STEEL, ROOF AND WALL OPENINGS:**

- A. Provide structural steel framework for supporting mechanical equipment as required.
- B. Unless otherwise indicated by the drawings, lintels for new mechanical openings shall be provided by the contractor installing the pipe or duct.
- C. Unless otherwise indicated by the drawings, angles to frame a new roof opening through the roof deck shall be provided by the contractor installing the pipe or duct through the roof.

- D. All steel work shall be in conformance with the requirement of the AISC Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings. Material shall conform to ASTM A36.

### **2.03 SLEAVES, CUTTING, AND CORE DRILLING:**

- A. Provide sleeves for piping and ductwork openings in masonry walls.
- B. The contractor shall saw cut or core drill existing masonry floors and walls for new ductwork and/or piping penetrations. The contractor shall cut new openings through framed walls for ductwork and/or piping penetrations. Provide headers as needed in frame walls.

### **2.04 FIRESTOPPING**

- A. Provide firestopping assemblies for the required fire ratings and listed in the current year certification books of UL, FM or ITS (Warnock Hersey).
- B. See the Architectural drawings for required ratings. Refer to the Mechanical drawings for additional ratings. Provide firestopping for all penetrations of these assemblies.

### **2.05 SEALING PENETRATIONS IN NON-RATED WALLS AND FLOORS**

- A. Provide caulk at penetrations of non-rated walls and floors for ductwork and piping. If the gap is too large for caulk, provide fiberglass insulation for backing. Conceal the fiberglass with either caulk or sheetmetal. Refer to specifications for sleeve requirements.
- B. In mechanical rooms and other water-proof floor areas, provide sleeves or concrete pads at least 2" higher than the top of slab to prevent water from running through the annular space between the duct or pipe and the floor opening. In addition to the sleeve, provide packing and caulking around the duct or pipe inside the sleeve to prevent noise transmission through openings in the floor.

### **2.06 ACCESS DOORS IN CEILINGS AND WALLS**

- A. Provide access doors in gypsum board ceilings and walls where needed for access to dampers or valves. Coordinate the installation of the access doors with the ceiling contractor. Confirm the location of the panels with the Architect.

## **PART 3 - EXECUTION**

### **3.01 FIRESTOPPING INSTALLATION**

- A. Verify openings are ready to receive the firestopping. Modify the openings as required to accommodate the requirements for the certified assembly drawing for the firestopping material.
- B. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter that could adversely affect bond of firestopping material.
- C. Remove incompatible materials that could adversely affect bond.

**END OF SECTION**



**SECTION 23 0110**  
**HVAC DEMOLITION**

**PART 1 - GENERAL**

**1.01 DESCRIPTION:**

- A. Contract documents and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections apply to this section.
- B. This section specifies the demolition and removal of all HVAC, equipment and distribution conduits including but not limited to ductwork, air outlets, piping, controls, insulation and accessories in existing building.
- C. Unless otherwise noted in the Documents, all salvage items removed in connection with this Contract are to become the property of the Contractor, however the Owner shall have the first right of refusal on all equipment removed.

**1.02 SUBMITTALS:**

- A. Proposed Dust Control and Noise Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate.
- B. Schedule of selective demolition activities:
  - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
  - 2. Interruption of building utility services.
  - 3. Coordination for shutoff, capping and continuation of services.
  - 4. Coordination of Owner's continued occupancy of portions of existing building and of Owner's occupancy of completed work.
- C. Pre-demolition photographs or videotape showing existing pre-demolition conditions of adjoining construction and site improvements, including finish surfaces that might be misconstrued as damage caused by selective demolition operations. Submit before demolition work begins.

**1.03 PROJECT CONDITIONS:**

- A. Owner will occupy portions of the building immediately adjacent to selective demolition area. Conduct demolition so Owner's operation will not be disturbed. Provide not less than 48 hours notice to Owner of activities that will affect the Owner's operations.
- B. Maintain existing services to Owner occupied areas during demolition if possible or coordinate interruption of services prior to demolition.
- C. Owner assumes no responsibility for condition of area to be selectively demolished.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
- E. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify the Owner. Hazardous materials will be removed by Owner under a separate contract.

**PART 2 - PRODUCTS**

**2.01 MATERIALS:**

- A. Materials and equipment for patching and extending work: As specified in individual Sections.

**PART 3 - EXECUTION**

**3.01 EXAMINATION:**

- A. Verify field measurements and existing ductwork arrangements are as shown on Drawings.
- B. Verify that abandoned equipment serves only abandoned facilities.
- C. Demolition drawings are based on causal field observation and existing record documents. The demolition Drawings are diagrammatic and show the general scope of demolition work and do

not show all the construction detail of the original record drawings. Report discrepancies to the Project Engineer before disturbing existing installation.

- D. The Contractor shall visit the existing building and ground and review the existing building record drawings for details of existing installation to familiarize himself with existing conditions prior to submitting bid. No allowance will be made subsequently, in this connection, on behalf of the contractor for any error or negligence on his part.
- E. Beginning of demolition means the Contractor accepts existing conditions.

### **3.02 PREPARATION:**

- A. Disconnect HVAC systems in areas scheduled for removal. Notify Project Engineer and Owner of areas to be affected by hvac demolition work prior to commencing.
- B. Disconnect automatic temperature controls in areas scheduled for removal. Notify Project Engineer and Owner of area to be affected by control demolition work prior to commencing.

### **3.03 SELECTIVE DEMOLITION AND EXTENSION OF EXISTING HVAC WORK:**

- A. Demolish and remove from site, and extend existing hvac work under provisions of this Division and as indicated on the Drawings unless otherwise noted.
- B. Salvage items noted to remain the property of the Owner shall be delivered to a location to be designated by the Owner. Contractor shall remove from construction areas all trash or debris as it accumulates and dispose of it off site at no additional cost to the Owner. All construction areas shall be kept clean, safe, and orderly at all times. At the completion and acceptance for work, Contractor shall remove from the site all debris and surplus materials resulting from this work and dispose of them off site at no additional cost to the Owner.
- C. Do not use cutting torches until work area is clear of flammable materials. At concealed spaces verify condition and contents of hidden space before starting flame cutting operations. Maintain Fire Watch and portable fire-suppression devices during flame-cutting operations. Maintain and evaluate ventilation during flame-cutting operations.
- D. Maintain ventilation for dust control during selective demolition process. Verify Owner requirements for dust control and conform to their standards for all demolition activities.
- E. Remove, relocate, and extend existing installations to accommodate new construction as required for proper installation and system operation.
- F. Remove all accessories above grade. When removing hvac equipment or terminal devices all associated pipe, duct, ATC devices, wiring, etc. shall be removed and capped as required. Cut piping, duct, tubing, etc. behind walls, above ceilings and below floors, and patch surfaces to match existing conditions. Finishes will be by others unless otherwise noted in documents.
- G. Neatly cut openings and holes plumb, square and true to dimension required. Use cutting methods least likely to damage construction to remain or adjoining construction. Cut and drill from exposed surfaces into concealed surfaces to avoid marring or spalling of finished surfaces. Temporarily cover openings to remain.
- H. Patch all openings created by removal of hvac equipment, ATC devices, duct, pipes, etc. unless noted as being patched by others. Openings to be patched to match existing with similar material and finish unless otherwise noted.
- I. Seal all existing roof penetrations, which will not be reused. Roof patching shall be the responsibility of the contractor.
- J. Remove, relocate or provide brackets, hangers, and other accessories as required.
- K. Repair adjacent construction and finished damaged during demolition and extension work.
- L. Maintain access to existing mechanical installations, which remain active.

### **3.04 CLEANING AND REPAIR:**

- A. Clean and repair existing materials and equipment, which remain or are to be returned to the Owner.

- B. All building surfaces damaged and openings left by new Work or the removal or relocation of hvac equipment, piping, etc., shall be repaired to original condition and painted by the Contractor.

**END OF SECTION**





**SECTION 23 0553**  
**IDENTIFICATION FOR HVAC**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Nameplates.
- B. Adhesive Film Labels.
- C. Tags.
- D. Stencils.

**1.02 REFERENCE STANDARDS**

- A. ASME A13.1 - Scheme for the Identification of Piping Systems; 2015.

**1.03 SUBMITTALS**

- A. Chart and Schedule: Submit a valve chart and schedule, including valve tag number, location and function.

**PART 2 PRODUCTS**

**2.01 IDENTIFICATION APPLICATIONS**

- A. Identification of Equipment Outside the Building:
  - 1. **All equipment provided by Division 23 outside the building shall be identified with laminated engraved plastic nameplates. Printed labels will not be accepted. Equipment outside the building may be on the roof, mounted on the exterior wall, set on grade, or other locations exposed to weather. Common equipment outside the building may include, but is not limited to, the following: exhaust fans, packaged rooftop units, make-up air units, condensing units, air cooled chillers, cooling towers, drycoolers, dust collectors, and pumps.**
- B. Identification Inside the Building:
  - 1. Air Handling Units, Energy Recovery Units, Heat Pumps, Furnaces, Fan Coil Units, Exhaust Fans and similar fan systems: Adhesive film labels..
  - 2. Air Terminal Units (Variable Air Volume Boxes): Adhesive film labels.
  - 3. Automatic Controls: Tags or Adhesive film labels. Key to control schematic.
  - 4. Control Panels: Adhesive film labels.
  - 5. Dampers: Tags or adhesive film labels on the actuator.
  - 6. Boilers: Adhesive film labels.
  - 7. Piping: Stencilled painting.
  - 8. Pumps: Adhesive film labels..
  - 9. Small-sized Equipment: Tags.
  - 10. Thermostats: Adhesive film labels behind the cover.
  - 11. Valves: Tags . Key to the plans and the valve schedule.
  - 12. Balancing Valves: Tags indicating design gpm and pressure drop. Key to the equipment served.

**2.02 NAMEPLATES**

- A. Description: Laminated three-layer plastic with engraved letters.
  - 1. Letter Color: White.
  - 2. Letter Height: 1/2 inch.
  - 3. Background Color: Black.

**2.03 ADHESIVE FILM LABELS**

- A. Description: Machine printed, black letters, by thermal transfer or equivalent process on a white background. Minimum letter height shall be 1/2 inch. The laminated label shall provide a durable surface resistant to water, glycol, heat and cold.

## **2.04 TAGS**

- A. Metal Tags: Aluminum or brass with stamped letters or with an adhesive film label; tag size minimum 1-1/2 inch diameter with smooth edges.
- B. Chart: Typewritten letter size list in anodized aluminum frame. Either a floor plan of the building indicating location of valve or describe location by room number, etc. Also include description of service and duty of valve, unless obvious from location on the floor plan.

## **2.05 STENCILS**

- A. Stencils: With clean cut symbols and letters of following size:
  - 1. 3/4 to 1-1/4 inch Outside Diameter of Insulation or Pipe: 8 inch long color field, 1/2 inch high letters.
  - 2. 1-1/2 to 2 inch Outside Diameter of Insulation or Pipe: 8 inch long color field, 3/4 inch high letters.
  - 3. 2-1/2 to 6 inch Outside Diameter of Insulation or Pipe: 12 inch long color field, 1-1/4 inch high letters.
  - 4. 8 to 10 inch Outside Diameter of Insulation or Pipe: 24 inch long color field, 2-1/2 inch high letters.
  - 5. Over 10 inch Outside Diameter of Insulation or Pipe: 32 inch long color field, 3-1/2 inch high letters.
  - 6. Ductwork and Equipment: 2-1/2 inch high letters.
- B. Stencil Paint: As specified in Section 09 9123, semi-gloss enamel, colors conforming to ASME A13.1.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Degrease and clean surfaces to receive adhesive for identification materials.
- B. Prepare surfaces in accordance with Section 09 9123 for stencil painting.

### **3.02 INSTALLATION**

- A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install identification labels at locations for the most convenient viewing without interference with operation and maintenance of equipment.
- C. Install tags with corrosion resistant chain.
- D. Tag automatic controls, instruments, and relays. Key to control schematic.
- E. Identify piping concealed above accessible ceilings with stencilled painting. Piping in equipment rooms, garages, tunnels and similar un-finished type spaces shall be identified with stencilled painting. Use tags on piping 3/4 inch diameter and smaller. Identify service, flow direction, and pressure. Install in clear view and align with the axis of piping. Location of identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and tee, at each side of penetration of structure or enclosure, and at each obstruction.

**END OF SECTION**

**SECTION 23 0593**  
**TESTING, ADJUSTING, AND BALANCING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Testing, adjustment, and balancing of air systems.
- B. Testing, adjustment, and balancing of hydronic systems.

**1.02 REFERENCE STANDARDS**

- A. AABC MN-1 - AABC National Standards for Total System Balance; 2002.
- B. NEBB (TAB) - Procedural Standards for Testing Adjusting and Balancing of Environmental Systems; 2015, Eighth Edition.
- C. SMACNA - HVAC Air Duct Leakage Test Manual, current edition.

**1.03 SUBMITTALS**

- A. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
  - 1. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.
  - 2. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
  - 3. Form of Test Reports: Reports in accordance with one of the referenced standards.
  - 4. Units of Measure: Report data in I-P (inch-pound) units only.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 GENERAL REQUIREMENTS**

- A. Perform total system balance in accordance with one of the following:
  - 1. AABC MN-1, AABC National Standards for Total System Balance.
  - 2. NEBB Procedural Standards for Testing Adjusting Balancing of Environmental Systems.
- B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.
- C. TAB Agency Qualifications:
  - 1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
  - 2. Certified by one of the following:
    - a. AABC, Associated Air Balance Council: [www.aabchq.com](http://www.aabchq.com); upon completion submit AABC National Performance Guaranty.
    - b. NEBB, National Environmental Balancing Bureau: [www.nebb.org](http://www.nebb.org).
- D. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

**3.02 EXAMINATION**

- A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
  - 1. Systems are started and operating in a safe and normal condition.
  - 2. Temperature control systems are installed complete and operable.
  - 3. Proper thermal overload protection is in place for electrical equipment.
  - 4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
  - 5. Duct systems are clean of debris.
  - 6. Fans are rotating correctly.
  - 7. Fire and volume dampers are in place and open.
  - 8. Air coil fins are cleaned and combed.

9. Access doors are closed and duct end caps are in place.
  10. Air outlets are installed and connected.
  11. Duct system leakage is minimized.
  12. Hydronic systems are flushed, filled, and vented.
  13. Pumps are rotating correctly.
  14. Proper strainer baskets are clean and in place.
  15. Service and balance valves are open.
  16. Suitable access to balancing valves and equipment is provided.
- B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.

### **3.03 ADJUSTMENT TOLERANCES**

- A. Air Handling Systems: Adjust to within plus or minus 10 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.
- B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 10 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.
- C. Hydronic Systems: Adjust to within plus or minus 10 percent of design.
- D. Plumbing Recirculating Hot Water Systems: Adjust to within plus or minus 10 percent of design.

### **3.04 RECORDING AND ADJUSTING**

- A. Ensure recorded data represents actual measured or observed conditions.
- B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- C. Mark on the drawings the locations where traverse and other critical measurements were taken and cross reference the location in the final report.
- D. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- E. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.
- F. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.

### **3.05 AIR SYSTEM PROCEDURE**

- A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities.
- B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct. A pitot tube traverse shall be required at each supply, return, exhaust, outside air, and relief air fan unless otherwise noted.
- C. Measure air quantities at air inlets and outlets.
- D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
- E. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
- F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.
- G. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.
- H. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

- I. Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling, and at minimum air flow rate, full heating.
- J. For variable air volume system powered units set volume controller to air flow setting indicated. Confirm connections properly made and confirm proper operation for automatic variable air volume temperature control.
- K. For variable air volume system, report the minimum required duct static pressure at the pressure transducer location(s) in order to provide design supply air quantities. Transmit in writing the required minimum pressure to the temperature controls subcontractor for programming the variable speed drive.
- L. Test air handling system in economizer mode. Verify proper operation and adjust, if necessary.

### **3.06 WATER SYSTEM PROCEDURE**

- A. Adjust water systems to provide required or design quantities.
- B. Use calibrated Venturi tubes, orifices, or other metered fittings and pressure gages to determine flow rates for system balance. Where flow metering devices are not installed, base flow balance on temperature difference across various heat transfer elements in the system.
- C. Effect system balance with automatic control valves fully open to heat transfer elements.
- D. Effect adjustment of water distribution systems by means of balancing cocks, valves, and fittings. Do not use service or shut-off valves for balancing unless indexed for balance point.
- E. Where available pump capacity is less than total flow requirements or individual system parts, full flow in one part may be simulated by temporary restriction of flow to other parts.
- F. For variable volume hydronic systems, report the minimum required pipe pressure at the pressure transducer location(s) in order to provide design supply water flows. Transmit in writing the required minimum pressure to the temperature controls subcontractor for programming the variable speed drive.

### **3.07 SCOPE**

- A. Test, adjust, and balance all mechanical and plumbing equipment indicated on the drawings and specifications. Submit reports on NEBB or AABC forms.

**END OF SECTION**



**SECTION 23 0713**  
**DUCT INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Duct insulation.
- B. Duct Liner.

**1.02 REFERENCE STANDARDS**

- A. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013.
- B. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014.
- C. ASTM C1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material); 2012.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2016.
- E. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- F. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Rev. 2009).
- G. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

**1.03 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section with not less than three years of documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified in this section, with minimum ten years of experience and approved by manufacturer.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.
- B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

**1.05 FIELD CONDITIONS**

- A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.
- B. Maintain temperature during and after installation for minimum period of 24 hours.

**PART 2 PRODUCTS**

**2.01 REGULATORY REQUIREMENTS**

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

**2.02 GLASS FIBER, FLEXIBLE**

- A. Manufacturer:
  - 1. Knauf Insulation: [www.knaufinsulation.com](http://www.knaufinsulation.com).
  - 2. Johns Manville: [www.jm.com](http://www.jm.com).
  - 3. Owens Corning Corporation: [www.ocbuildingspec.com](http://www.ocbuildingspec.com).
  - 4. CertainTeed Corporation: [www.certainteed.com](http://www.certainteed.com).
- B. Vapor Barrier Jacket:
  - 1. Kraft paper with glass fiber yarn and bonded to aluminized film.

2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.
  3. Secure with pressure sensitive tape.
- C. Tie Wire: Annealed steel, 16 gage, 0.0508 inch diameter.

## **2.03 DUCT LINER**

- A. Manufacturers:
1. Armaflex AP Duct Liner
  2. Or approved equal
- B. Insulation: Flexible closed cell insulation complying with ASTM C 1534.
1. Apparent Thermal Conductivity: Maximum of .250 at 75 degrees F.
  2. Service Temperature: Up to 180 degrees F.
- C. Liner Fasteners: Galvanized steel, self-adhesive pad with integral head.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that ducts have been tested before applying insulation materials.
- B. Verify that surfaces are clean, foreign material removed, and dry.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NAIMA National Insulation Standards.
- C. Insulated Duct Application:
1. Provide insulation with vapor barrier jackets.
  2. Finish with tape and vapor barrier jacket.
  3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
  4. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.
- D. Duct and Plenum Liner Application:
1. Adhere insulation with adhesive for 100 percent coverage.
  2. Secure insulation with mechanical liner fasteners. Refer to SMACNA (DCS) for spacing.
  3. Seal and smooth joints. Seal and coat transverse joints.
  4. Seal liner surface penetrations with adhesive.
  5. Duct dimensions indicated are net inside dimensions. Sizes have allowed for the thickness of liner.
  6. Ductwork indicated as lined on the drawings shall also be provided with external insulation as scheduled unless specifically excluded.

### **3.03 SCHEDULES**

- A. R-values listed in the schedule are minimum values. The requirement is for installed R-value assuming 25% compression of the insulation. PCF is an abbreviation for pounds per cubic foot.
- B. Outside Air Intake, Relief Ducts & Outside/Return Mixed Air Ducts:
1. Flexible Glass Fiber: 2 inches thick, 1.50 pcf
- C. Supply Ducts:
1. Flexible Glass Fiber: 2 inches thick, 0.75 pcf (R-5)
- D. Transfer air ducts: 1/2 inch thick Duct Liner
- E. Insulated Flexible Ducts: R-5

## **END OF SECTION**



**SECTION 23 0719**  
**HVAC PIPING INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Piping insulation.
- B. Jackets and accessories.

**1.02 REFERENCE STANDARDS**

- A. ASTM C195 - Standard Specification for Mineral Fiber Thermal Insulating Cement; 2007 (Reapproved 2013).
- B. ASTM C533 - Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation; 2013.
- C. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2016.
- D. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation; 2015.
- E. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2016a.
- F. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2015b.
- G. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2013).
- H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2016.
- I. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- J. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

**1.03 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum five years of experience.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

**1.05 FIELD CONDITIONS**

- A. Maintain ambient conditions required by manufacturers of each product.
- B. Maintain temperature before, during, and after installation for minimum of 24 hours.

**PART 2 PRODUCTS**

**2.01 REGULATORY REQUIREMENTS**

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

**2.02 GLASS FIBER**

- A. Manufacturers:
  - 1. Johns Manville Corporation: [www.jm.com](http://www.jm.com).
  - 2. Knauf Insulation: [www.knaufinsulation.com](http://www.knaufinsulation.com).
  - 3. Owens Corning Corporation; Fiberglas Pipe Insulation ASJ: [www.ocbuildingspec.com/sle](http://www.ocbuildingspec.com/sle).
- B. Insulation: ASTM C547 and ASTM C795; semi-rigid, noncombustible, end grain adhered to jacket.

1. Maximum Service Temperature: 650 degrees F.
2. Maximum Moisture Absorption: 0.2 percent by volume.
- C. Vapor Barrier Jacket: White kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E96/E96M of 0.02 perm-inches.

### **2.03 FLEXIBLE ELASTOMERIC CELLULAR INSULATION**

- A. Manufacturer:
  1. Armacell LLC: [www.armacell.us](http://www.armacell.us).
- B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 3; use molded tubular material wherever possible.
  1. Minimum Service Temperature: Minus 40 degrees F.
  2. Maximum Service Temperature: 220 degrees F.
  3. Connection: Waterproof vapor barrier adhesive.
- C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that piping has been tested before applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NAIMA National Insulation Standards.
- C. Exposed Piping: Locate insulation and cover seams in least visible locations.
- D. Insulated pipes conveying fluids below ambient temperature; insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
- E. Glass fiber insulated pipes conveying fluids below ambient temperature:
  1. Provide vapor barrier jackets, factory-applied or field-applied; secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic.
  2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.
- F. For hot piping conveying fluids 140 degrees F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation.
- G. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.
- H. Glass fiber insulated pipes conveying fluids above ambient temperature.
  1. Provide standard jackets, with or without vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples.
  2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
- I. Inserts and Shields:
  1. Application: Piping 1-1/2 inches diameter or larger.
  2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
  3. Insert location: Between support shield and piping and under the finish jacket.
  4. Insert Configuration: Minimum 6 inches long, of same thickness and contour as adjoining insulation; may be factory fabricated.
  5. Insert Material: Hydrous calcium silicate insulation or other heavy density insulating material suitable for the planned temperature range.

- J. Continue insulation through walls, sleeves, pipe hangers, and other pipe penetrations. Finish at supports, protrusions, and interruptions.

### **3.03 SCHEDULE**

A. Heating Systems:

1. Heating Supply and Return (Glycol and Non-Glycol):

a. Glass Fiber

- |                     |            |
|---------------------|------------|
| 1) 1-1/2" and less: | 1 1/2 inch |
| 2) 2" and larger:   | 2 inch     |

B. Cooling Systems:

1. Refrigerant Suction:

a. Flexible Elastomeric

- |                       |            |
|-----------------------|------------|
| 1) 1" and less:       | 1 inch     |
| 2) 1 1/4" and larger: | 1 1/2 inch |

2. Refrigerant Hot Gas:

a. Flexible Elastomeric

- |                       |            |
|-----------------------|------------|
| 1) 1" and less:       | 1 inch     |
| 2) 1 1/4" and larger: | 1 1/2 inch |

**END OF SECTION**



**SECTION 23 0913**  
**CONTROL DEVICES FOR HVAC**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Thermostats.
- B. Humidistats.
- C. Control valves.
- D. Automatic dampers.
- E. Damper operators.

**1.02 REFERENCE STANDARDS**

- A. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- B. NEMA DC 3 - Residential Controls - Electrical Wall-Mounted Room Thermostats; 2013.

**PART 2 PRODUCTS**

**2.01 EQUIPMENT - GENERAL**

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

**2.02 CONTROL PANELS**

- A. Unitized cabinet type for each system under automatic control with relays and controls mounted in cabinet and temperature indicators, pressure gauges, pilot lights, push buttons and switches flush on cabinet panel face.
- B. NEMA 250, general purpose utility enclosures with enamelled finished face panel.
- C. Provide common keying for all panels.

**2.03 CONTROL VALVES**

- A. Globe Pattern:
  - 1. Hydronic Systems:
    - a. Rate for service pressure of 125 psig at 250 degrees F.
    - b. Size for 3 psig maximum pressure drop at design flow rate.
- B. Electronic Operators:
  - 1. Valves shall spring return to normal position as indicated on freeze, fire, or temperature protection.
  - 2. Select operator for full shut off at maximum pump differential pressure.

**2.04 OUTSIDE AIR AND RELIEF AIR CONTROL DAMPERS**

- A. Outside Air and Relief Air Dampers meeting the following specifications shall be furnished and installed where shown on plans.
- B. Dampers shall consist of: .125 (3.2mm) aluminum channel frame insulated with polystyrene on four sides and thermally broken with dual polyurethane resin gaps; aluminum airfoil blade internally insulated polyurethane foam and thermally broken. Blades shall be completely symmetrical relative to their axle pivot point, presenting identical resistance to airflow in either direction or pressure on either side of the damper. Axle will be 1/2 in. (13mm) diameter plated steel; bearings are dual bearing with acetal inner sleeve, flanged outer bearing resulting in no metal-to-metal or metal-to-plastic contact.
- C. Blade and jamb seals to be silicone rubber and external (out of the airstream) blade-to-blade linkage.
- D. Dampers manufacturer's printed application and performance data including pressure, velocity, leakage, and temperature limitations shall be submitted for approval showing damper suitable for pressures to 8 in. wg (1993 Pa), velocities to 4000 fpm (20.3 m/s), standard air leakage less than 8 cfm/sq. ft. @ 4 in. wg and temperatures to 200 °F

- E. Damper air performance data shall be developed in accordance with the latest edition of AMCA Standard 500-D.
- F. Basis of design is Greenheck ICD-45. Dampers shall be equivalent by other approved manufacturers.

## **2.05 DAMPER OPERATORS**

- A. Direct Coupled Electronic Operators:
  - 1. Spring return control damper actuators shall be direct coupled type which require no crankarm and linkage and be capable of direct mounting. The actuator must provide proportional damper control in response to a 2 to 10 VDC or a 4 to 20 mA control input from an electronic controller or positioner.
  - 2. The actuators must be designed so that they may be used for either clockwise or counterclockwise fail-safe operation.
  - 3. Actuators shall have control direction of rotation switch accessible on its cover. Actuators shall use a brushless DC motor controlled by a microprocessor and be protected from overload at all angles of rotation. Run time shall be constant, and independent of torque. A 2 to 10 VDC feedback signal shall be provided for position feedback or master-slave applications.
  - 4. Actuators shall be UL listed and CSA certified, have a 5 year warranty, and be manufactured under ISO 9001 International Quality Control Standards.

## **2.06 HUMIDISTATS**

- A. Room Humidistats:
  - 1. Wall mounted, proportioning type.
  - 2. Throttling range: Adjustable 2 percent relative humidity.
  - 3. Cover: Set point indication.

## **2.07 INPUT/OUTPUT SENSORS**

- A. Temperature Sensors:

## **2.08 THERMOSTATS**

- A. Electric Room Thermostats:
  - 1. Type: NEMA DC 3, 24 volts, with setback/setup temperature control.
  - 2. Service: Cooling and heating.

# **PART 3 EXECUTION**

## **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that systems are ready to receive work.
- C. Beginning of installation means installer accepts existing conditions.
- D. Sequence work to ensure installation of components is complementary to installation of similar components in other systems.
- E. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.
- F. Ensure installation of components is complementary to installation of similar components.
- G. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.

## **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Check and verify location of thermostats with plans and room details before installation. Locate 48 inches above floor. Align with lighting switches .
- C. Provide mixing dampers of opposed blade construction arranged to mix streams.

- D. Provide isolation (two position) dampers of parallel blade construction.
- E. Provide conduit and electrical wiring in accordance with Section 26 2717. Electrical material and installation shall be in accordance with appropriate requirements of Division 26.

### **3.03 SCHEDULES**

- A. Control Valve Schedule (Normal Position)
  - 1. Hot Water Coils - Normally Open.

**END OF SECTION**





**SECTION 23 0923**  
**DIRECT-DIGITAL CONTROL SYSTEM**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. System description.
- B. Operator interface.
- C. Power supplies and line filtering.
- D. System software.
- E. Controller software.

**1.02 SUBMITTALS**

- A. Product Data: Provide data for each system component and software module.
- B. Shop Drawings:
  - 1. Indicate trunk cable schematic showing programmable control unit locations, and trunk data conductors.
  - 2. Indicate system graphics indicating monitored systems, data (connected and calculated) point addresses, and operator notations. Provide demonstration diskette containing graphics.
  - 3. Show system configuration with peripheral devices, batteries, power supplies, diagrams, modems, and interconnections.
  - 4. Indicate description and sequence of operation of operating, user, and application software.
- C. Manufacturer's Instructions: Indicate manufacturer's installation instructions for all manufactured components.
- D. Project Record Documents: Record actual locations of control components, including control units, thermostats, and sensors.
- E. Operation and Maintenance Data:
  - 1. Include interconnection wiring diagrams complete field installed systems with identified and numbered, system components and devices.
  - 2. Include keyboard illustrations and step-by-step procedures indexed for each operator function.
  - 3. Include inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.

**1.03 QUALITY ASSURANCE**

- A. Perform work in accordance with NFPA 70.
- B. Designer Qualifications: Perform design of system software under direct supervision of a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- C. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.
- D. Installer Qualifications: Company specializing in performing work of the type specified and with minimum three years of documented experience and approved by manufacturer.
- E. Products Requiring Electrical Connection: Listed and classified by UL (DIR) as suitable for purpose specified and indicated.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Andover Controls

## 2.02 SYSTEM DESCRIPTION

- A. Automatic temperature control field monitoring and control system using field programmable micro-processor based units.
- B. Base system on distributed system of fully intelligent, stand-alone controllers, operating in a multi-tasking, multi-user environment on token passing network, with central and remote hardware, software, and interconnecting wire and conduit.
- C. Include computer software and hardware, operator input/output devices, control units, local area networks (LAN), sensors, control devices, actuators.
- D. Controls for variable air volume terminals, radiation, reheat coils, unit heaters, fan coils, and the like when directly connected to the control units. Individual terminal unit control is specified in Section 23 0913.
- E. Provide control systems consisting of thermostats, control valves, dampers and operators, indicating devices, interface equipment and other apparatus and accessories required to operate mechanical systems, and to perform functions specified.
- F. Include installation and calibration, supervision, adjustments, and fine tuning necessary for complete and fully operational system.

## 2.03 OPERATOR INTERFACE

- A. PC Based Work Station:
  - 1. Connect new equipment to existing BAS system. Coordinate connections to existing system with owner.
- B. Workstation, controllers, and control backbone to communicate using BACnet protocol and addressing.

## 2.04 CONTROLLERS

- A. BUILDING CONTROLLERS
  - 1. General:
    - a. Manage global strategies by one or more, independent, standalone, microprocessor based controllers.
    - b. Provide sufficient memory to support controller's operating system, database, and programming requirements.
    - c. Share data between networked controllers.
    - d. Controller operating system manages input and output communication signals allowing distributed controllers to share real and virtual object information and allowing for central monitoring and alarms.
    - e. Utilize real-time clock for scheduling.
    - f. Continuously check processor status and memory circuits for abnormal operation.
    - g. Controller to assume predetermined failure mode and generate alarm notification upon detection of abnormal operation.
    - h. Communication with other network devices to be based on assigned protocol.
  - 2. Communication:
    - a. Controller to reside on a BACnet network using ISO 8802-3 (ETHERNET) Data Link/Physical layer protocol.
    - b. Perform routing when connected to a network of custom application and application specific controllers.
    - c. Provide service communication port for connection to a portable operator's terminal or hand held device with compatible protocol.
  - 3. Anticipated Environmental Ambient Conditions:
    - a. Outdoors and/or in Wet Ambient Conditions:
      - 1) Mount within waterproof enclosures.
      - 2) Rated for operation at 40 to 150 degrees F.
    - b. Conditioned Space:
      - 1) Mount within dustproof enclosures.

- 2) Rated for operation at 32 to 120 degrees F.
4. Provisions for Serviceability:
  - a. Diagnostic LEDs for power, communication, and processor.
  - b. Make all wiring connections to field removable, modular terminal strips, or to a termination card connected by a ribbon cable.
5. Memory: In the event of a power loss, maintain all BIOS and programming information for a minimum of 72 hours.
6. Power and Noise Immunity:
  - a. Maintain operation at 90 to 110 percent of nominal voltage rating.
  - b. Perform orderly shutdown below 80 percent of nominal voltage.
  - c. Operation protected against electrical noise of 5 to 120 Hz and from keyed radios up to 5 W. at 3 feet.
- B. INPUT/OUTPUT INTERFACE
  1. Hardwired inputs and outputs tie into the DDC system through building, custom application, or application specific controllers.
  2. All Input/Output Points:
    - a. Protect controller from damage resulting from any point short-circuiting or grounding and from voltage up to 24 volts of any duration.
    - b. Provide universal type for building and custom application controllers where input or output is software designated as either binary or analog type with appropriate properties.
  3. Binary Inputs:
    - a. Allow monitoring of On/Off signals from remote devices.
    - b. Provide wetting current of 12 mA minimum, compatible with commonly available control devices and protected against the effects of contact bounce and noise.
    - c. Sense dry contact closure with power provided only by the controller.
  4. Pulse Accumulation Input Objects: Conform to all requirements of binary input objects and accept up to 10 pulses per second.
  5. Analog Inputs:
    - a. Allow for monitoring of low voltage 0 to 10 VDC, 4 to 20 mA current, or resistance signals (thermistor, RTD).
    - b. Compatible with and field configurable to commonly available sensing devices.
  6. Binary Outputs:
    - a. Used for On/Off operation or a pulsed low-voltage signal for pulse width modulation control.
    - b. Outputs provided with three position (On/Off/Auto) override switches.
    - c. Status lights for building and custom application controllers to be selectable for normally open or normally closed operation.
  7. Analog Outputs:
    - a. Monitoring signal provides a 0 to 10 VDC or a 4 to 20 mA output signal for end device control.
    - b. Provide status lights and two position (AUTO/MANUAL) switch for building and custom application controllers with manually adjustable potentiometer for manual override on building and custom application controllers.
    - c. Drift to not exceed 0.4 percent of range per year.
  8. Tri State Outputs:
    - a. Coordinate two binary outputs to control three point, floating type, electronic actuators without feedback.
    - b. Limit the use of three point, floating devices to the following zone and terminal unit control applications:
    - c. Control algorithms run the zone actuator to one end of its stroke once every 24 hours for verification of operator tracking.
  9. System Object Capacity:

- a. System size to be expandable to twice the number of input output objects required by providing additional controllers, including associated devices and wiring.
- b. Hardware additions or software revisions for the installed operator interfaces are not to be required for future, system expansions.

## **2.05 POWER SUPPLIES AND LINE FILTERING**

- A. Power Supplies:
  1. Provide UL listed control transformers with Class 2 current limiting type or over-current protection in both primary and secondary circuits for Class 2 service as required by the NEC.
  2. Limit connected loads to 80 percent of rated capacity.
  3. Match DC power supply to current output and voltage requirements.
  4. Unit to be full wave rectifier type with output ripple of 5.0 mV maximum peak to peak.
  5. Regulation to be 1 percent combined line and load with 100 microsecond response time for 50 percent load changes.
  6. Provide over-voltage and over-current protection to withstand a 150 percent current overload for 3 seconds minimum without trip-out or failure.
  7. Operational Ambient Conditions: 32 to 120 degrees F.
  8. EM/RF meets FCC Class B and VDE 0871 for Class B and MIL-STD 810 for shock and vibration.
  9. Line voltage units UL recognized and CSA approved.
- B. Power Line Filtering:
  1. Provide external or internal transient voltage and surge suppression component for all workstations and controllers.
  2. Minimum surge protection attributes:
    - a. Dielectric strength of 1000 volts minimum.
    - b. Response time of 10 nanoseconds or less.
    - c. Transverse mode noise attenuation of 65 dB or greater.
    - d. Common mode noise attenuation of 150 dB or greater at 40 to 100 Hz.

## **2.06 LOCAL AREA NETWORK (LAN)**

- A. Provide communication between control units over local area network (LAN).
- B. LAN Capacity: Not less than 60 stations or nodes.
- C. Break in Communication Path: Alarm and automatically initiate LAN reconfiguration.
- D. LAN Data Speed: Minimum 19.2 Kb.
- E. Communication Techniques: Allow interface into network by multiple operation stations and by auto-answer/auto-dial modems. Support communication over telephone lines utilizing modems.
- F. Transmission Median: Fiber optic or single pair of solid 24 gage twisted, shielded copper cable.
- G. Network Support: Time for global point to be received by any station, shall be less than 3 seconds. Provide automatic reconfiguration if any station is added or lost. If transmission cable is cut, reconfigure two sections with no disruption to system's operation, without operator intervention.

## **2.07 SYSTEM SOFTWARE**

- A. Operating System:
  1. Connect to existing system software.

## **2.08 CONTROLLER SOFTWARE**

- A. All applications reside and operate in the system controllers and editing of all applications occurs at the operator workstation.
- B. System Security:
  1. User access secured via user passwords and user names.
  2. Passwords restrict user to the objects, applications, and system functions as assigned by the system manager.

3. User Log On/Log Off attempts are recorded.
4. Automatic Log Off occurs following the last keystroke after a user defined delay time.
- C. Object or Object Group Scheduling:
  1. Weekly Schedules Based on Separate, Daily Schedules:
    - a. Include start, stop, optimal stop, and night economizer.
    - b. 10 events maximum per schedule.
    - c. Start/stop times adjustable for each group object.
- D. Provide standard application for equipment coordination and grouping based on function and location to be used for scheduling and other applications.
- E. Alarms:
  1. Binary object is set to alarm based on the operator specified state.
  2. Analog object to have high/low alarm limits.
  3. All alarming is capable of being automatically and manually disabled.
  4. Alarm Reporting:
    - a. Operator determines action to be taken for alarm event.
    - b. Alarms to be routed to appropriate workstation.
    - c. Reporting Options:
- F. Maintenance Management: System monitors equipment status and generates maintenance messages based upon user-designated run-time limits.
- G. Sequencing: Application software based upon specified sequences of operation in Section 23 0993.
- H. PID Control Characteristics:
  1. Direct or reverse action.
  2. Anti-windup.
  3. Calculated, time-varying, analog value, positions an output or stages a series of outputs.
  4. User selectable controlled variable, set-point, and PED gains.
- I. Staggered Start Application:
  1. Prevents all controlled equipment from simultaneously restarting after power outage.
  2. Order of equipment startup is user selectable.
- J. Energy Calculations:
  1. Accumulated instantaneous power or flow rates are converted to energy use data.
  2. Algorithm calculates a rolling average and allows window of time to be user specified in minute intervals.
  3. Algorithm calculates a fixed window average with a digital input signal from a utility meter defining the start of the window period that in turn synchronizes the fixed-window average with that used by the power company.
- K. Anti-Short Cycling:
  1. All binary output objects protected from short-cycling.
  2. Allows minimum on-time and off-time to be selected.
- L. On-Off Control with Differential:
  1. Algorithm allows binary output to be cycled based on a controlled variable and set-point.
  2. Algorithm to be direct-acting or reverse-acting incorporating an adjustable differential.
- M. Run-Time Totalization:
  1. Totalize run-times for all binary input objects.
  2. Provides operator with capability to assign high run-time alarm.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.

- B. Verify that conditioned power supply is available to the control units and to the operator work station. Verify that field end devices, wiring, and pneumatic tubing is installed prior to installation proceeding.

### **3.02 INSTALLATION**

- A. Install control units and other hardware in position on permanent walls where not subject to excessive vibration.
- B. Install software in control units and in operator work station. Implement all features of programs to specified requirements and appropriate to sequence of operation. Refer to Section 23 0993.
- C. Provide with 120V AC, 15 amp dedicated emergency power circuit to each programmable control unit.
- D. Provide conduit and electrical wiring in accordance with Section 26 2717. Electrical material and installation shall be in accordance with appropriate requirements of Division 26. Minimum conduit size is 3/4 inches.

### **3.03 MANUFACTURER'S FIELD SERVICES**

- A. Start and commission systems. Allow sufficient time for start-up and commissioning prior to placing control systems in permanent operation.
- B. Provide basic operator training for 8 persons on data display, alarm and status descriptors, requesting data, execution of commands and request of logs. Include a minimum of 4 hours dedicated instructor time. Provide training on site.

### **3.04 DEMONSTRATION AND INSTRUCTIONS**

- A. Demonstrate complete and operating system to Owner.

**END OF SECTION**

**SECTION 23 2113**  
**HYDRONIC PIPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Hydronic system requirements.
- B. Heating water and glycol piping, above grade.
- C. Pipe hangers and supports.
- D. Unions, flanges, mechanical couplings, and dielectric connections.
- E. Valves:
  - 1. Ball valves.
  - 2. Gate Valves
  - 3. Globe Valves
  - 4. Butterfly valves.
- F. Manual Balancing Valves.

**1.02 REFERENCE STANDARDS**

- A. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Welding, Brazing, and Fusing Qualifications; 2015.
- B. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2012.
- C. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2013.
- D. ASME B31.9 - Building Services Piping; 2014.
- E. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.
- F. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).
- G. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2014.
- H. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2009.

**1.03 SYSTEM DESCRIPTION**

- A. Where more than one piping system material is specified, ensure system components are compatible and joined to ensure the integrity of the system is not jeopardized. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.
- B. Use unions and flanges downstream of valves and at equipment or apparatus connections. Do not use direct welded or threaded connections to valves, equipment or other apparatus.
- C. Use ball or butterfly valves for shut-off and to isolate equipment, part of systems, or vertical risers.
- D. Use ball or butterfly valves for throttling, bypass, or manual flow control services.
- E. Use 3/4 inch ball valves with cap for drains at main shut-off valves, low points of piping, bases of vertical risers, and at equipment. Pipe to nearest floor drain.

**1.04 SUBMITTALS**

- A. Welders Certificate: Include welders certification of compliance with ASME BPVC-IX.
- B. Product Data:
  - 1. Indicate balancing valve data and ratings.
- C. Project Record Documents: Record actual locations of valves.

### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section, with minimum ten years of experience.
- C. All welding of pipe shall be performed by AWS certified welders.

### **1.06 REGULATORY REQUIREMENTS**

- A. Conform to ASME B31.9 code for installation of piping system.
- B. All welding of pipe shall be performed by AWS certified welders.

### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary protective coating on cast iron and steel valves.
- C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

### **1.08 FIELD CONDITIONS**

- A. Do not install underground piping when bedding is wet or frozen.

### **1.09 EXTRA MATERIALS**

- A. Provide two repacking kits for each size and valve type.

### **1.10 WARRANTIES**

## **PART 2 PRODUCTS**

### **2.01 HYDRONIC SYSTEM REQUIREMENTS**

- A. Comply with ASME B31.9 and applicable federal, state, and local regulations.
- B. Piping: Provide piping, fittings, hangers and supports as required, as indicated, and as follows:
  - 1. Where more than one piping system material is specified, provide joining fittings that are compatible with piping materials and ensure that the integrity of the system is not jeopardized.
  - 2. Provide pipe hangers and supports in accordance with ASME B31.9 or MSS SP-58 unless indicated otherwise.
- C. Valves: Provide valves where indicated:

### **2.02 HEATING WATER AND GLYCOL PIPING, ABOVE GRADE**

- A. Steel Pipe: ASTM A53/A53M, Schedule 40, black, using one of the following joint types:
  - 1. Fittings: ASTM B 16.3, malleable iron or ASTM A 234/A 234M, wrought steel welding type fittings.
  - 2. Joints: Threaded, or AWS D1.1 welded.
- B. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), drawn, using one of the following joint types:
  - 1. Solder Joints for 2 inch and smaller/Brazed Joints for 2-1/2 inch and larger: ASME B16.18 cast brass/bronze or ASME B16.22 solder wrought copper fittings.
    - a. Solder: ASTM B32 lead-free solder, HB alloy (91-5 tin-antimony) or tin and silver.
  - 2. Tee Connections: Mechanically extracted collars with notched and dimpled branch tube.
  - 3. Mechanical Press Sealed Fittings: Double pressed type complying with ASME B16.22, utilizing EPDM, nontoxic synthetic rubber sealing elements.
    - a. Manufacturers:
      - 1) Viega LLC; \_\_\_\_\_: [www.viega.com](http://www.viega.com).
  - 4. Joints: Solder, lead free, 95-5 tin-antimony, or tin and silver.



### **2.03 PIPE HANGERS AND SUPPORTS**

- A. Provide hangers and supports that comply with MSS SP-58.
  - 1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
- B. Provide oversized hangers on insulated pipe to allow insulation at full thickness to be provided on the piping.
- C. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Malleable iron, adjustable swivel, split ring.
- D. Hangers for Cold Pipe Sizes 2 Inches and Greater: Carbon steel, adjustable, clevis.
- E. Hangers for Hot Pipe Sizes 2 inch and Over: Carbon steel, adjustable, clevis.
- F. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
- G. Multiple or Trapeze Hangers for Hot Pipe Sizes 6 Inches and Greater: Steel channels with welded spacers and hanger rods, cast iron roll.
- H. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
- I. Wall Support for Pipe Sizes 4 Inches and Greater: Welded steel bracket and wrought steel clamp.
- J. Wall Support for Hot Pipe Sizes 6 Inches and Greater: Welded steel bracket and wrought steel clamp with adjustable steel yoke and cast iron roll.
- K. Vertical Support: Steel riser clamp.
- L. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
- M. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.
- N. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.
- O. In grooved installations, use rigid couplings with offsetting angle-pattern bolt pads or with wedge shaped grooves in header piping to permit support and hanging in accordance with ASME B31.9.

### **2.04 UNIONS, FLANGES, MECHANICAL COUPLINGS, AND DIELECTRIC CONNECTIONS**

- A. Unions for Pipe 2 Inches and Less:
  - 1. Ferrous Piping: 150 psig malleable iron, threaded.
  - 2. Copper Pipe: Bronze, soldered joints.
- B. Flanges for Pipe 2 Inches and Greater:
  - 1. Ferrous Piping: 150 psig forged steel, slip-on.
  - 2. Copper Piping: Bronze.
  - 3. Gaskets: 1/16 inch thick preformed neoprene.

### **2.05 BALL VALVES**

- A. Manufacturers:
  - 1. Conbraco Industries: [www.apollovalves.com](http://www.apollovalves.com).
  - 2. Jomar.
  - 3. Stockham
- B. Up To and Including 2 Inches:
  - 1. Bronze one piece body, chrome plated brass ball, teflon seats and stuffing box ring, lever handle with balancing stops, solder ends with union.

### **2.06 BUTTERFLY VALVES**

- A. Manufacturers:
  - 1. Nibco, Inc: [www.nibco.com](http://www.nibco.com).
  - 2. Stockham

- B. Disc: Construct of aluminum bronze, chrome plated ductile iron, stainless steel, ductile iron with EPDM encapsulation, or Buna-N encapsulation.
- C. Body: Class 150, cast or ductile iron with resilient replaceable EPDM seat, lug ends, extended neck. Body shall be grooved end black enamel coated ductile iron where grooved piping is allowed.
- D. Operator: 10 position lever handle.
- E. For use in pipes 2-1/2 inch and larger.

## **2.07 MANUAL BALANCING VALVE**

- A. Manufacturers:
  - 1. Griswold Controls: [www.griswoldcontrols.com](http://www.griswoldcontrols.com).
  - 2. Tour & Andersson
  - 3. Armstrong
  - 4. ITT Bell & Gossett: [www.bellgossett.com](http://www.bellgossett.com).
  - 5. Pro Hydronics Specialties
  - 6. Gerand.
  - 7. Taco, Inc: [www.taco-hvac.com](http://www.taco-hvac.com).
  - 8. Nexus
  - 9. Stockham
- B. Manual Balancing Valves:
  - 1. Construction Option 1: Class 125, brass body housing including a full port isolation ball valve with memory stop, venturi measurement device, dual pressure/temperature test valves, and unions on inlet and outlet.
  - 2. Construction Option 2: Class 125, brass body housing including a y-pattern globe style calibrated port balancing valve design, dual pressure/temperature test valves, and unions on inlet and outlet. Provide wheel handle with memory stop for balancing adjustments.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare piping connections to equipment using jointing system specified.
- D. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.
- E. After completion, fill, clean, and treat systems.

### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install heating water, glycol, chilled water, condenser water, and engine exhaust piping to ASME B31.9 requirements. Install chilled water piping to ASME B31.5 requirements.
  - 1. Sleeve pipe passing through partitions, walls and floors.
  - 2. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified.
  - 3. Slope piping and arrange to drain at low points. Provide 1/2" ball valve and cap at each high point for manual air vent. Provide 1/2" ball valve and cap at each low point for drain.
  - 4. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
  - 5. Install temperature controls devices furnished by the controls contractor. Review requirements with the controls contractor. Provide thermo-wells for temperature sensors.
- C. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

- D. Provide oversized hangers on insulated pipe to allow insulation at full thickness to be provided on all cold temperature piping and hot temperature piping 2 inch and larger.
- E. Provide access panels where valves and fittings are not exposed.
- F. Use eccentric reducers to maintain top of pipe level.
- G. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welds.
- H. Install valves with stems upright or horizontal, not inverted.
- I. All new hydronic heating/cooling system piping shall be pressure tested at 1-1/2 times the maximum system design pressure; but not less than 100 psi (hydrostatically) for 15 minutes (minimum).
- J. For grooved pipe installations, a factory trained representative shall provide on-site training to contractor for use of grooving tools and product installation.

**END OF SECTION**



**SECTION 23 2114**  
**HYDRONIC SPECIALTIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Air vents.
- B. Pressure-temperature test plugs.

**1.02 REFERENCE STANDARDS**

**1.03 SUBMITTALS**

- A. Product Data: Provide product data for manufactured products and assemblies required for this project. Include component sizes, rough-in requirements, service sizes, and finishes. Include product description and model.

**1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- C. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

**PART 2 PRODUCTS**

**2.01 AIR VENTS**

- A. Manual Type: Short vertical section of pipe to form air chamber, with 1/2" ball valve, 3/4" hose thread and cap.
  - 1. Under Finned Tube Radiation Cover Only: Contactors option to provide manual coin operated vent with brass needle valve.

**2.02 PRESSURE-TEMPERATURE TEST PLUGS**

- A. Construction: Brass body designed to receive temperature or pressure probe with removable protective cap, and Neoprene rated for minimum 200 degrees F.
- B. Application: Use extended length plugs to clear insulated piping.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Install specialties in accordance with manufacturer's instructions.
- B. Provide manual air vents at system high points and as indicated.
- C. Provide valved drain and hose connection on strainer blow down connection.

**END OF SECTION**



**SECTION 23 2300**  
**REFRIGERANT PIPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Piping.
- B. Refrigerant.
- C. Moisture and liquid indicators.
- D. Valves.
- E. Strainers.
- F. Filter-driers.
- G. Expansion valves.
- H. Flexible connections.

**1.02 REFERENCE STANDARDS**

- A. AHRI 710 - Performance Rating of Liquid-Line Driers; 2009.
- B. AHRI 750 - Standard for Thermostatic Refrigerant Expansion Valves; 2007.
- C. ASHRAE Std 15 - Safety Standard for Refrigeration Systems; 2013.
- D. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2013.
- E. ASME B31.5 - Refrigeration Piping and Heat Transfer Components; 2013.
- F. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2014.
- G. ASTM B280 - Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service; 2016.
- H. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2011-AMD 1.

**1.03 SYSTEM DESCRIPTION**

- A. Where more than one piping system material is specified ensure system components are compatible and joined to ensure the integrity of the system is not jeopardized. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.
- B. Liquid Indicators:
  - 1. Use line size liquid indicators in main liquid line leaving condenser.
- C. Valves:
  - 1. Use service valves on suction and discharge of compressors.
- D. Filter-Driers:
  - 1. Use a filter-drier immediately ahead of liquid-line controls, such as thermostatic expansion valves, solenoid valves, and moisture indicators.
- E. Flexible Connectors: Utilize at or near compressors where piping configuration does not absorb vibration.

**1.04 SUBMITTALS**

- A. Product Data: Provide general assembly of specialties, including manufacturers catalogue information. Provide manufacturers catalog data including load capacity.
- B. Manufacturer's Installation Instructions: Indicate support, connection requirements, and isolation for servicing.
- C. Maintenance Data: Include instructions for changing cartridges, assembly views, spare parts lists.

## **1.05 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum five years of documented experience.

## **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Protect piping and specialties from entry of contaminating material by leaving end caps and plugs in place until installation.

## **PART 2 PRODUCTS**

### **2.01 PIPING**

- A. Copper Tube (ACR): ASTM B 280, H58 hard drawn or O60 soft annealed.
  - 1. Fittings: ASME B16.22 wrought copper.
  - 2. Joints: Braze, AWS A5.8M/A5.8 BCuP silver/phosphorus/copper alloy.
- B. Pre-insulated Linesets:
  - 1. Factory insulated linesets. Refer to Piping Insulation specifications for insulation requirements.
  - 2. Repair all cracks and exposed piping after installation.
- C. Pipe Supports and Anchors:
  - 1. Provide oversized hangers on insulated pipe to allow insulation at full thickness to be provided on the piping.
  - 2. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
  - 3. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

### **2.02 ACCESSORIES**

- A. Contractor is to provide accessories as recommended by the Condensing Unit Manufacturer.

### **2.03 REFRIGERANT**

### **2.04 MOISTURE AND LIQUID INDICATORS**

- A. Indicators: Single port type, UL listed, with copper or brass body, flared or solder ends, sight glass, color coded paper moisture indicator with removable element cartridge and plastic cap; for maximum temperature of 200 degrees F and maximum working pressure of 500 psi.

### **2.05 VALVES**

- A. Service Valves:
  - 1. Forged brass body with copper stubs, brass caps, removable valve core, integral ball check valve, flared or solder ends, for maximum pressure of 500 psi.

### **2.06 FILTER-DRIERS**

- A. Performance:
  - 1. Pressure Drop: 2 psi, maximum, when operating at full connected evaporator capacity.
  - 2. Design Working Pressure: 350 psi, minimum.
- B. Cores: Molded or loose-fill molecular sieve desiccant compatible with refrigerant, activated alumina, activated charcoal, and filtration to 40 microns, with secondary filtration to 20 microns; of construction that will not pass into refrigerant lines.
- C. Construction: UL listed.
  - 1. Connections: As specified for applicable pipe type.

### **2.07 EXPANSION VALVES**

- A. Angle or Straight Through Type: AHRI 750; design suitable for refrigerant, brass body, internal or external equalizer, bleed hole, adjustable superheat setting, replaceable inlet strainer, with non-replaceable capillary tube and remote sensing bulb and remote bulb well.
- B. Selection: Evaluate refrigerant pressure drop through system to determine available pressure drop across valve. Select valve for maximum load at design operating pressure and minimum



10 degrees F superheat. Select to avoid being undersized at full load and excessively oversized at part load.

## **2.08 FLEXIBLE CONNECTORS**

- A. Corrugated stainless steel hose with single layer of stainless steel exterior braiding, minimum 9 inches long with copper tube ends; for maximum working pressure of 500 psi.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

### **3.02 INSTALLATION**

- A. Install refrigeration specialties in accordance with manufacturer's instructions.
- B. Route piping in orderly manner, with plumbing parallel to building structure, and maintain gradient.
- C. Install piping to conserve building space and avoid interference with use of space.
- D. Group piping whenever practical at common elevations and locations. Slope piping one percent in direction of oil return.
- E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- F. Pipe Hangers and Supports:
  - 1. Install in accordance with ASME B31.5.
  - 2. Provide oversized hangers on insulated pipe to allow insulation at full thickness to be provided on the piping.
  - 3. Support horizontal piping as scheduled.
  - 4. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
  - 5. Place hangers within 12 inches of each horizontal elbow.

### **3.03 FIELD QUALITY CONTROL**

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Test refrigeration system in accordance with ASME B31.5.
- C. Pressure test system with dry nitrogen to 200 psi. Perform final tests at 27 inches vacuum and 200 psi using halide torch. Test to no leakage.

**END OF SECTION**



**SECTION 23 2500**  
**CHEMICAL WATER TREATMENT**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Materials.
  - 1. System cleaner.
  - 2. Closed system treatment (water).
- B. Glycol.

**1.02 SUBMITTALS**

- A. Product Data: Provide chemical treatment materials, chemicals, and equipment including electrical characteristics and connection requirements.
- B. Manufacturer's Field Reports: Indicate start-up of treatment systems when completed and operating properly. Indicate analysis of system water after cleaning and after treatment.
- C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 6000 - Product Requirements, for additional provisions.
  - 2. Sufficient chemicals for treatment and testing during required maintenance period.

**1.03 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum five years of experience and approved by manufacturer.

**1.04 MAINTENANCE SERVICE**

- A. Furnish service and maintenance of treatment systems for one year from Date of Substantial Completion.
- B. Provide semi-annual technical service visits to perform field inspections and make water analysis on site. Detail findings in writing on proper practices, chemical treating requirements, and corrective actions needed. Submit two copies of field service report after each visit.
- C. Provide laboratory and technical assistance services during this maintenance period.
- D. Include two hour training course for operating personnel, instructing them on installation, care, maintenance, testing, and operation of water treatment systems. Arrange course at start up of systems.

**1.05 MAINTENANCE MATERIALS**

- A. Supply sufficient chemicals for treatment and testing during warranty period.

**PART 2 PRODUCTS**

**2.01 GLYCOL SYSTEM**

- A. Mixing Tank and Transfer Pump: 55 gallon plastic chemical drum with fittings suitable for filling. Self priming pump to transfer chemicals from drum to system. Pump shall be Dayton #2P390 or equivalent 1/3 hp, 120 volt, single phase, ODP motor with automatic reset thermal protection, provide minimum 8 foot cord and plug.
- B. Glycol Solution:
  - 1. Manufacturers:
    - a. DOW
    - b. Rhomar Water Management
    - c. Interstate
  - 2. Inhibited ethylene glycol and water solution mixed 50 percent glycol - 50 percent water, suitable for operating temperatures from -30 degrees F to 200 degrees F. The solution shall have a pH between 8.0 and 9.0, a reserve alkalinity of 6.6ml HCl/10ml, no flash point, no silicates and a fluorescent color.

3. The de-ionized water used to dilute the concentrate and the pre-mixed solutions, if necessary, shall contain less than: 100 ppm calcium carbonate hardness 40 ppm calcium plus magnesium ions 50 ppm chloride plus sulfate ions.
4. The heat transfer fluid shall be an inhibited glycol-based industrial heat transfer fluid specifically formulated for use in HVAC SYSTEMS. The fluid must contain corrosion inhibitors and buffers and an antifoam agent, necessary for long fluid and system life.
5. COMMERCIAL AUTOMOBILE ANTIFREEZE SOLUTIONS, UNINHIBITED GLYCOL OR FIELD INHIBITED GLYCOL IS NOT ACCEPTABLE.
6. The system shall have a nameplate and shall contain the following information:
  - a. Date of original Heat Transfer Fluid charge
  - b. Description of Heat Transfer Fluid
  - c. Manufacture's Name, Address and Telephone
  - d. Percentage and Type of Glycol
  - e. Freeze Point & Burst Point
  - f. Total System Gallons
  - g. Reference to Material Safety Sheet
  - h. Instructions for Sampling of Fluid
  - i. Month for Annual Sampling
  - j. Mailing Instructions to independent testing laboratory
7. Provide additional inhibitors as recommended by manufacturer if glycol percentage is below manufacturers recommendations.
8. **Existing glycol hot water system mixture is 50% ethylene glycol. Contractor's option to reuse existing glycol mixture as well as provide additional glycol mixture for new glycol hot water system and piping. Drain down existing glycol system as required and store on site during construction.**

## 2.02 MATERIALS

- A. System Cleaner:
  1. Liquid alkaline compound with emulsifying agents and detergents to remove grease and petroleum products; sodiumtripoly phosphate and sodium molybdate.
- B. Closed System Treatment (Water):
  1. Sequestering agent to reduce deposits and adjust pH; polyphosphate.
  2. Corrosion inhibitors; boron-nitrite, sodium nitrite and borax, sodium totyltriazole, low molecular weight polymers, phosphonates, sodium molybdate, or sulphites.
  3. Conductivity enhancers; phosphates or phosphonates.

## PART 3 EXECUTION

### 3.01 PREPARATION

- A. Systems shall be operational, filled, started, and vented prior to cleaning. Use water meter to record capacity in each system.
- B. Place terminal control valves in open position during cleaning.
- C. Verify that electric power is available and of the correct characteristics.

### 3.02 FLUSHING SEQUENCE

- A. Flush all dirt and debris using potable water flowing at twice the normal operating flow rate (velocities of 8 feet per second, minimum) for a minimum of four hours or until no dirt or debris is visible, whichever is longer. If the building system pumps are used for flushing of the system, new pump seals shall be provided after system water treatment has been completed.

### 3.03 INSTALLATION

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

### **3.04 CLOSED SYSTEM TREATMENT**

- A. Provide one bypass feeder on each system. Install isolating and drain valves and necessary piping. Install around balancing valve downstream of circulating pumps unless indicated otherwise.
- B. Introduce closed system treatment through bypass feeder when required or indicated by test.
- C. After the system is filled and the air is properly purged, allow the fluid to circulate for minimum 24 hours. Then, pull a sample using the sample kit provided by the manufacturer.
- D. The analysis from the manufacturer should list the following:
  - 1. pH, Color, Clarity
  - 2. Reserve Alkalinity, ml
  - 3. Inhibitors: Ferrous, Copper & Brass Corrosion Products
  - 4. Degradation Products
  - 5. Corrosives
  - 6. Scale Promoters
  - 7. Contaminants

### **3.05 GLYCOL SYSTEMS**

- A. Remodel Projects with existing systems: Prior to the start of construction, pull a sample of the existing system solution and send to a testing lab for analysis. Provide a test report to the Engineer and to the Owner. Identify any concerns about the condition of the system solution.
- B. Clean and flush glycol system before adding glycol solution.
- C. Feed glycol solution to system through make-up line with pressure regulator, venting system high points.
- D. After the system is filled and the air is properly purged, allow the fluid to circulate for minimum 24 hours. Then, pull a sample using the sample kit provided by the manufacturer. Provide report to Engineer and Architect.
- E. Contractor shall pull a second sample six months after the initial fill, and on the anniversary of the fill. Samples shall be sent to the manufacturer for analysis.
- F. The flushing, filling and glycol for the entire hydronic system including the ground coupled heat exchanger shall be responsibility of section 23 2500 HVAC Water Treatment.
- G. The analysis from the manufacturer should list the following:
  - 1. Concentration, vol %
  - 2. Freeze Point, Degrees F
  - 3. pH, Color, Clarity
  - 4. Reserve Alkalinity, ml
  - 5. Inhibitors: Ferrous, Copper & Brass Corrosion Products
  - 6. Degradation Products
  - 7. Corrosives
  - 8. Scale Promoters
  - 9. Contaminants
- H. Manufacturer report shall be submitted to the Engineer for the inclusion in the building submittal records for distribution to the Owner.

**END OF SECTION**



**SECTION 23 3100**  
**HVAC DUCTS AND CASINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Metal ductwork.
- B. Nonmetal ductwork.

**1.02 REFERENCE STANDARDS**

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements; 2015.
- C. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry Elements; 2012.
- D. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements; 2015.
- E. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.
- F. NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems; 2015.
- G. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Rev. 2009).
- H. SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual; 2012, 2nd Edition.
- I. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; current edition, including all revisions.

**1.03 SUBMITTALS**

- A. Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate, following SMACNA (LEAK).
- B. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

**1.04 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum five years of documented experience.

**1.05 FIELD CONDITIONS**

- A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.
- B. Maintain temperatures within acceptable range during and after installation of duct sealants.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Galvanized Steel for Ducts: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.
- B. Aluminum for Ducts: ASTM B 209 (ASTM B 209M); aluminum sheet, alloy 3003-H14.  
Aluminum Connectors and Bar Stock: Alloy 6061-T651 or of equivalent strength.
- C. Hanger Rod: ASTM A36/A36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.
- D. Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:
  - 1. Concrete Wedge Expansion Anchors: Complying with ICC-ES AC193.
  - 2. Masonry Wedge Expansion Anchors: Complying with ICC-ES AC01.
  - 3. Concrete Screw Type Anchors: Complying with ICC-ES AC193.
  - 4. Masonry Screw Type Anchors: Complying with ICC-ES AC106.
- E. Insulated Flexible Ducts:

1. UL 181, Class 1, aluminum laminate and polyester film with latex adhesive supported by helically wound spring steel wire; fiberglass insulation; polyethylene vapor barrier film.
  - a. Pressure Rating: 10 inches WG positive and 1.0 inches WG negative.
  - b. Maximum Velocity: 4000 fpm.
  - c. Temperature Range: -20 degrees F to 210 degrees F.
  - d. Insulation: Minimum of R-5. The requirement is for installed R-value assuming 25% compression of the insulation.
- F. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
  1. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
  2. Surface Burning Characteristics: Flame spread of zero, smoke developed of zero, when tested in accordance with ASTM E 84.

## **2.02 DUCTWORK FABRICATION**

- A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
- B. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
- C. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide air foil turning vanes of perforated metal with glass fiber insulation.
- D. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- E. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide blank-out panels sealing louver area around duct. Use same material as duct, painted black on exterior side; seal to louver frame and duct.

## **2.03 MANUFACTURED DUCTWORK AND FITTINGS**

- A. Manufacture in accordance with SMANCA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing and sealing for operating pressures indicated.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install, support, and seal ducts in accordance with SMACNA (DCS).
- B. Install in accordance with manufacturer's instructions.
- C. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
- D. Duct sizes indicated are inside clear dimensions.
- E. Install and seal metal and flexible ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.
- F. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- G. Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with crimp in direction of air flow.
- H. Use double nuts and lock washers on threaded rod supports.
- I. Do not use flexible duct to change direction.
- J. Connect diffusers or light troffer boots to low pressure ducts directly or with 5 feet maximum length of flexible duct held in place with strap or clamp.



- K. Connect flexible ducts to metal ducts per detail located on drawings
- L. Set plenum doors 6 to 12 inches above floor. Arrange door swings so that fan static pressure holds door in closed position.
- M. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
- N. At exterior wall louvers, seal duct to louver frame and install blank-out panels.
- O. If test and balance report shows the duct traverse at the fan to be 10% or higher than the sum of the outlets, the contractor shall be required to re-seal ductwork to reduce leakage to less than 10%. Contractor shall be responsible for removing and replacing ceiling tiles, removing and replacing duct insulation and all other work required to re-seal ductwork.

### **3.02 SCHEDULES**

- A. Ductwork Pressure Class:
  - 1. Fan Coil Systems
    - a. Supply main ducts, 1 inch w.g.
    - b. Return main ducts, 1 inch w.g.
    - c. Branch ductwork, 0.5 inch w.g.
    - d. Outside air and relief air ductwork, 1 inch w.g.

**END OF SECTION**



**SECTION 23 3300**  
**AIR DUCT ACCESSORIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Duct access doors.
- B. Duct test holes.
- C. Flexible duct connections.
- D. Volume control dampers.

**1.02 REFERENCE STANDARDS**

- A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.
- B. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Rev. 2009).

**1.03 SUBMITTALS**

- A. Product Data: Provide for shop fabricated assemblies including volume control dampers. Include electrical characteristics and connection requirements.
- B. Project Record Drawings: Record actual locations of access doors and test holes.
- C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. Extra Fusible Links: One of each type and size.

**1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

**PART 2 PRODUCTS**

**2.01 DUCT ACCESS DOORS**

- A. Fabrication: Rigid and close-fitting of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ducts, install minimum 1 inch thick insulation with sheet metal cover.
  - 1. Up to 24 inches square: Provide paired camlocks.
  - 2. Larger than 24 inches: Provide hinge and compression latches.
- B. Access doors with sheet metal screw fasteners are not acceptable.

**2.02 DUCT TEST HOLES**

- A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.
- B. Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

**2.03 FLEXIBLE DUCT CONNECTIONS**

- A. Fabricate in accordance with SMACNA (DCS) and as indicated.
- B. Flexible Duct Connections: Fabric crimped into metal edging strip.
  - 1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 30 oz per sq yd.
    - a. Net Fabric Width: Approximately 2 inches wide.

**2.04 VOLUME CONTROL DAMPERS**

- A. Fabricate in accordance with SMACNA (DCS) and as indicated.
- B. Single Blade Dampers: Fabricate for duct sizes up to 6 by 30 inch.

- C. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 by 72 inch. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.
- D. End Bearings: Except in round ducts 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon, thermoplastic elastomer, or sintered bronze bearings.
- E. Quadrants:
  - 1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
  - 2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.
  - 3. Where rod lengths exceed 30 inches provide regulator at both ends.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). Refer to Section 23 3100 for duct construction and pressure class.
- B. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere as indicated. If there are conflicts to this minimum access for any damper, contact the Engineer for review. Refer to the drawings and details for size of panels. Where no size is indicated on the drawings, hand access shall be minimum 8" x 8" and shoulder access shall be minimum 24" x 24".
- C. Provide duct test holes where indicated and required for testing and balancing purposes.
- D. Verify operation of all smoke and combination fire/smoke dampers. Provide documentation of testing.
- E. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.
- F. At equipment supported by vibration isolators, provide flexible duct connections immediately adjacent to the equipment.
- G. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off.
- H. Provide control dampers as indicated on the drawings.
- I. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

**END OF SECTION**

**SECTION 23 3700**  
**AIR OUTLETS AND INLETS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Diffusers.
- B. Registers/grilles.

**1.02 REFERENCE STANDARDS**

- A. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; 2012.
- B. ASHRAE Std 70 - Method of Testing the Performance of Air Outlets and Inlets; 2006 (R2011).
- C. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2005 (Rev. 2009).

**1.03 SUBMITTALS**

- A. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

**1.04 QUALITY ASSURANCE**

- A. Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.
- B. Test and rate louver performance in accordance with AMCA 500-L.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS - GRILLES & DIFFUSERS**

- A. Carnes, a division of Carnes Company Inc: [www.carnes.com](http://www.carnes.com).
- B. Price Industries: [www.price-hvac.com](http://www.price-hvac.com).
- C. Titus: [www.titus-hvac.com](http://www.titus-hvac.com).
- D. Nailor
- E. Pottorff
- F. Tuttle & Bailey

**2.02 SQUARE CONE CEILING DIFFUSERS**

- A. Type: Die formed with smooth surfaces and no corner joints. Three concentric cones. Adjustable pattern controllers where indicated on the schedule on the drawings.
- B. Frame: Refer to the reflected ceiling plans. Where the ceiling is gypsum board, provide plaster frame and ceiling frame. Confirm the type of tees for lay-in tile ceilings in the Architects specification. Provide frame for narrow tee ceilings if required.
- C. Fabrication: Steel with steel frame and baked enamel off-white finish, unless otherwise noted on the drawings.
- D. Accessories: Refer to schedule on the drawings for requirements of opposed blade balancing dampers, radiation dampers and fire blankets.

**2.03 CEILING GRID CORE EXHAUST AND RETURN REGISTERS/GRILLES**

- A. Type: Fixed grilles of 1/2 x 1/2 x 1/2 inch louvers.
- B. Fabrication: Aluminum with factory off-white enamel finish.
- C. Frame: Channel lay-in frame for suspended grid ceilings. Where the ceiling is gypsum board, provide plaster frame and ceiling frame. Confirm the type of tees for lay-in tile ceiling in the Architects specification. Provide frame for narrow tee ceiling if required.
- D. Accessories: Refer to schedule on the drawings for requirements of opposed blade balancing dampers, radiation dampers and fire blankets.

## **2.04 SUPPLY REGISTERS/GRILLES**

- A. Type: Streamlined and individually adjustable blades, 3/4 inch minimum depth, 3/4 inch maximum spacing with spring or other device to set blades, vertical face, double deflection.
- B. Frame: 1-1/4 inch margin with countersunk screw mounting and gasket.
- C. Fabrication: Steel with 20 gage minimum frames and 22 gage minimum blades, steel and aluminum with 20 gage minimum frame, or aluminum extrusions, with factory baked enamel finish. Note: grilles not located in the same room may be selected in different colors.
- D. Accessories: Refer to schedule on the drawings for requirements of opposed blade balancing dampers, radiation dampers and fire blankets.

## **2.05 EXHAUST AND RETURN REGISTERS/GRILLES**

- A. Type: Streamlined blades, 3/4 inch minimum depth, 3/4 inch maximum spacing, with spring or other device to set blades, vertical face.
- B. Frame: 1-1/4 inch margin with countersunk screw mounting.
- C. Fabrication: Steel with 20 gage minimum frames and 22 gage minimum blades, steel and aluminum with 20 gage minimum frame, or aluminum extrusions, with factory baked enamel finish. Note: grilles not located in the same room may be selected in different colors.
- D. Accessories: Refer to schedule on the drawings for requirements of opposed blade balancing dampers, radiation dampers and fire blankets.

# **PART 3 EXECUTION**

## **3.01 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.
- C. Install diffusers to ductwork with air tight connection.
- D. Provide balancing dampers on duct take-off to diffusers, and grilles and registers.
- E. Paint ductwork visible behind air outlets and inlets matte black.
- F. Inside the building, where sidewall return or exhaust grilles are mounted entirely above six feet above finished floor, install them in inverted position for sight-proof.

**END OF SECTION**

**SECTION 23 8127**  
**FANCOILS AND CONDENSING UNITS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Air cooled condensing units.
- B. Indoor air handler (fan & coil) units for duct connection.

**1.02 REFERENCE STANDARDS**

- A. AHRI 210/240 - Standard for Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment; 2008, Including All Addenda.
- B. AHRI 520 - Performance Rating of Positive Displacement Condensing Units; 2004.
- C. ASHRAE Std 15 - Safety Standard for Refrigeration Systems; 2013.
- D. ASHRAE Std 23.1 - Methods of Testing for Rating the Performance of Positive Displacement Refrigerant Compressors and Condensing Units that Operate at Subcritical Temperatures of the Refrigerant; 2010.
- E. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015.
- F. NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems; 2015.
- G. UL 207 - Standard for Refrigerant-Containing Components and Accessories, Nonelectrical; Current Edition, Including All Revisions.

**1.03 SUBMITTALS**

- A. See Section 01300 - Submittal and Substitutions, for submittal procedures.
- B. Product Data: Provide rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.
- C. Shop Drawings: Indicate assembly, required clearances, and location and size of field connections.
- D. Warranty: Submit manufacturers warranty and ensure forms have been filled out in Owner's name and registered with manufacturer.

**1.04 WARRANTY**

- A. Provide three year manufacturers warranty for solid state ignition modules.
- B. Provide five year manufacturers warranty for heat exchangers.

**PART 2 PRODUCTS**

**2.01 SYSTEM DESIGN**

- A. Split-System Heating and Cooling Units: Self-contained, packaged, matched factory-engineered and assembled, pre-wired indoor and outdoor units; UL listed.
  - 1. Provide refrigerant lines internal to units and between indoor and outdoor units, factory cleaned, dried, pressurized and sealed, with insulated suction line.
- B. Performance Requirements: See Drawings for additional requirements.
  - 1. Efficiency: Energy Efficiency Rating (EER)/Coefficient of Performance (COP) not less than requirements of ASHRAE Std 90.1; seasonal efficiency to ASHRAE Std 103.

**2.02 INDOOR UNITS FOR DUCTED SYSTEMS**

- A. Manufacturers:
  - 1. First Company
  - 2. Amana
  - 3. Williams

- B. Indoor Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, heating and cooling element(s), controls, and accessories; wired for single power connection with control transformer.
  - 1. Air Flow Configuration: Horizontal.
  - 2. Cabinet: Steel with baked enamel finish, easily removed and secured access doors with safety interlock switches, glass fiber insulation with reflective liner.
- C. Supply Fan: Centrifugal type, rubber mounted with direct drive ECM motor.
- D. Air Filters: 1 inch thick glass fiber, disposable type arranged for easy replacement.
- E. Evaporator Coils: Copper tube aluminum fin assembly, galvanized or polymer drain pan sloped in all directions to drain, drain connection, refrigerant piping connections, restricted distributor or thermostatic expansion valve.
  - 1. Construction and Ratings: In accordance with AHRI 210/240 and UL 207.
  - 2. Manufacturers: System manufacturer.
- F. Heater: Factory installed hot water heating coil.

### 2.03 OUTDOOR UNITS

- A. Manufacturers:
  - 1. Carrier
  - 2. Lennox
  - 3. Trane
  - 4. York
  - 5. Rheem
  - 6. Ruud
  - 7. Goodman
  - 8. Bryant
  - 9. Armstrong
- B. Outdoor Units: Self-contained, packaged, pre-wired unit consisting of cabinet, with compressor and condenser.
  - 1. Construction and Ratings: In accordance with AHRI 210/240 with testing in accordance with ASHRAE Std 23.1 and UL 207.
- C. Compressor: Hermetic, two speed 1800 and 3600 rpm, AHRI 520 resiliently mounted integral with condenser, with positive lubrication, crankcase heater, high pressure control, motor overload protection, service valves and drier. Provide time delay control to prevent short cycling and rapid speed changes.
- D. Accessories: Filter drier, high pressure switch (manual reset), low pressure switch (automatic reset), service valves and gage ports, thermometer well (in liquid line).
  - 1. Provide thermostatic expansion valves.
- E. Operating Controls:
  - 1. Low Ambient Kit: Provide refrigerant pressure switch to cycle condenser fan on when condenser refrigerant pressure is above 285 psig and off when pressure drops below 140 psig for operation to 0 degrees F.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that substrates are ready for installation of units and openings are as indicated on shop drawings.
- B. Verify that proper power supply is available and in correct location.
- C. Verify that proper fuel supply is available for connection.

### 3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions and requirements of local authorities having jurisdiction.



- B. Install in accordance with NFPA 90A and NFPA 90B.
- C. Install refrigeration systems in accordance with ASHRAE Std 15.
- D. Install condensing unit on 4" thick concrete pad.
- E. Pipe drain from cooling coils to nearest floor drain.

**END OF SECTION**



PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Basic Electrical Requirements applicable to Division 26 and Division 1 - General Requirements.

1.02 REFERENCES

- A. NFPA 70 - National Electrical Code; National Fire Protection Association; 2011.

1.03 DEFINITIONS

- A. The meaning and intent of the word "provide" as used in these specifications is the same as the words "The Contractor (and/or Bidder) shall provide."
- B. The word "provide" shall carry the same meaning as "furnish and install."

1.04 PERFORMANCE REQUIREMENTS

- A. Conform to all applicable Building Codes, ordinances, laws and regulations.
- B. Electrical: Conform to NFPA 70 - National Electrical Code.
- C. Furnish products listed and classified by Underwriters Laboratories Inc.®, as suitable for the purpose specified and shown.
- D. Obtain permits, and request inspections from authority having jurisdiction.
- E. If the drawings and/or specifications conflict with any regulatory requirement, the regulatory requirement shall be followed. This does not relieve the Contractor from complying with items in the drawings and/or specifications in excess of the regulatory requirements.
- F. Test Standards:
  - 1. All materials and equipment shall be listed, labeled or certified by a nationally recognized testing laboratory to meet Underwriters Laboratories, Inc.®, standards where test standards have been established. Equipment and materials which are not covered by UL® Standards will be accepted provided the equipment and material is listed, labeled, certified or otherwise determined to meet safety requirements of a nationally recognized testing laboratory acceptable to the authority having jurisdiction.
  - 2. Definitions:
    - a. Listed; equipment or device of a kind mentioned which:
      - 1) Is published by a nationally recognized laboratory which makes periodic inspection of production of such equipment.
      - 2) States that such equipment meets nationally recognized standards or has been tested and found safe for use in a specified manner.
    - b. Labeled; equipment or device is when:
      - 1) It embodies a valid label, symbol, or other identifying mark of a nationally recognized testing laboratory such as Underwriters Laboratories Inc.®
      - 2) The laboratory makes periodic inspections of the production of such equipment.
      - 3) The labeling indicates compliance with nationally recognized standards or tests to determine safe use in a specified manner.
    - c. Certified; equipment or product is which:
      - 1) Has been tested and found by a nationally recognized testing laboratory to meet nationally recognized standards or to be safe for use in a specified manner.

- 2) Production of equipment or product is periodically inspected by a nationally recognized testing laboratory.
- 3) Bears a label, tag, or other record of certification.
- d. Nationally recognized testing laboratory; laboratory which is approved by the authority having jurisdiction.

1.05 PROJECT/SITE CONDITIONS

- A. Install Work in locations shown on Drawings, unless prevented by Project conditions.
- B. Prepare drawings showing proposed rearrangement of Work to meet Project conditions, including changes to Work specified in other Sections. Obtain permission of Architect/Engineer before proceeding.

1.06 SUBMITTALS

- A. See Section 01300 - Submittals and Substitutions, for submittal procedures.
- B. Product Data: Submit product data grouped to include complete submittals of related systems, products, and accessories.
- C. Shop Drawings: Submit Shop Drawings grouped to include complete submittals of related systems, products, and accessories.
- D. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- E. Mark dimensions and values in units to match those specified.

1.07 DRAWINGS

- A. The drawings indicate the general arrangement and extent of electrical work. Do not scale off the drawings. All data shall be field verified with actual field conditions. Contractor shall be responsible to field measure and confirm mounting heights and location of equipment with respect to existing structures and field conditions.
- B. The drawings and specifications are complementary each to the other. What is called for by one shall be as binding as if called for by both.
- C. Omissions or discrepancies between different drawings or between drawings and specifications or between contract documents and regulations and/or codes shall be brought to the attention of the Architect/Engineer for a decision in writing. Interpretation before the bid shall be by addendum only. If an interpretation is not given by addendum, bid the greater quantity or better quality.

1.08 PERMITS AND LICENSES

- A. Obtain and pay for required licenses and permits. Pay for fees and charges for connection to outside services. Coordinate costs for electrical service including transformers, telephone service, cable TV service during the bidding phase of the project. Pay for use of property other than the site of the work for storage of materials or other purposes.
- B. Installation shall be performed by persons licensed and skilled in the trade, and shall be done under the supervision of a master electrician licensed by the State.

1.09 PROGRESS OF WORK

- A. Organize electrical work such that the progress of the work will conform to the progress of other trades, and complete the entire installation as soon as the conditions of the building

will permit. Any cost resulting from defective or ill-timed work performed under this section shall be borne by this Contractor.

- B. Portions of work will be required to be accomplished during other than normal working hours.

#### 1.10 CORRELATION OF WORK

- A. Organize work so that it will not interfere with the work of other trades. Consult the drawings and specifications for work of other trades to correlate information, and consult the architectural and structural drawings for details and dimensions. Verify the location of all outlets. If interference develops, bring it to the attention of the Architect/Engineer for a decision. No additional compensation will be allowed for the moving of misplaced outlets, wiring or equipment.
- B. Before roughing-in for electrical equipment furnished by others, verify the voltage and current characteristics and control connections of this equipment, and provide the proper feeders and connections as recommended by the manufacturer of the equipment.

#### 1.11 CUTTING AND PATCHING

- A. Lay out all work in advance and where removal of door frames, portions of walls, ceilings or floors are required, and cutting, channeling, chasing, or drilling of building surfaces is necessary for the proper installation of electrical equipment, carefully perform this work in a manner which does not weaken floors and walls. Damaged surfaces shall be repaired at no cost to the Owner.
- B. Concrete shall be cut only with rotary type drilling tools. Electrical equipment shall not be cut with torches, and shall be joined only by bolting (i.e., do not weld wireways to panels).
- C. Patching, when required, shall be finished to match adjoining surfaces and is subject to approval by the Architect/Engineer.

#### 1.12 EXAMINATION OF SITE

- A. Before submitting a bid, each bidder shall examine the site, check the means of installing electrical equipment and shall be familiar with the existing conditions and limitations. No extras will be allowed because of the Contractor's misunderstanding of the amount of work involved or lack of knowledge of any site conditions which may affect the work. Any apparent variance of the drawings or specifications from the existing conditions at the site shall be called to the attention of the Architect/Engineer before submitting a bid.

#### 1.13 OPERATION AND MAINTENANCE DATA

- A. Submit under provisions of Section 01300 Submittals and Substitutions. Reference Paragraph 10 Manuals for Operation and Maintenance Manual requirements.

#### 1.14 DELIVERY, STORAGE AND HANDLING

- A. The Contractor is responsible for receiving all deliveries and proper storage and protection of all products. Storage of products on site shall be coordinated with the Owner prior to beginning work.

#### 1.15 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Section 01300 and Section 01700.
- B. Include all changes and deviations from contract documents. Clearly mark in red colored pencil. Include all addendum items and approved change orders.

1.16 MINIMUM REQUIREMENTS

- A. References to the National Electrical Code (NEC), Underwriters Laboratories, Inc. (UL), National Fire Protection Association (NFPA), National Electrical Installation Standards (NEIS), and any other applicable standards are minimum installation requirement standards.
- B. Drawings and other specification sections shall govern in those instances where requirements are greater than those specified in the above standards.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical demolition.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching and extending work: As specified in individual sections.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify field measurements and circuiting arrangements are as shown on Drawings.
- B. Demolition drawings are based on casual field observation and existing record documents.
- C. Report discrepancies to Architect before disturbing existing installation.
- D. Beginning of demolition means installer accepts existing conditions.

3.02 PREPARATION

- A. Field verify exact locations of devices and disconnect existing lightning protection systems to be removed.
- B. Coordinate utility service outages with utility company.
- C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- D. Existing Electrical Services and Panelboards: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
  - 1. Obtain permission from Owner at least 2 weeks before partially or completely disabling system.
  - 2. Make temporary connections to maintain service in areas adjacent to work area.
  - 3. Work may need to be done outside normal working hours to avoid disruption of power to any critical areas. Coordinate required work hours with the Owner.
- E. Ceiling & HVAC Remodel: In areas where the ceilings are being removed and replaced, all existing conduit and cabling that remains shall be resupported in accordance with these specifications. In areas where existing HVAC ductwork and piping are being removed and replaced, relocate existing conduit and boxes that are to remain to accommodate installation of new ductwork and piping. Coordinate with mechanical contractor. Provide new cable support hangers in accordance with Section 27-1005 to resupport existing cables and new conduit straps and supports in accordance with section 26 05 34.

3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Remove, relocate, and extend existing installations to accommodate new construction.
- B. Remove abandoned wiring to source of supply.

- C. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- D. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets which are not removed.
- E. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- F. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
- G. Repair adjacent construction and finishes damaged during demolition and extension work.
- H. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.
- I. Install junction boxes in walls, ceilings or floors if required to continue wiring.
- J. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified.

#### 3.04 MATERIAL DISPOSAL

- A. Material and equipment deemed salvageable by the Owner shall remain the property of Owner. Contractor shall dismantle these items to manageable size and deliver to designated storage area on site. The Owner shall have first right of refusal on all material and equipment.
- B. All other materials and equipment shall become property of Contractor and must be removed from site and disposed of by approved method.
- C. Fluorescent lamps and high intensity discharge lamps shall be packed in suitable shipping cartons and broken lamps shall be put in suitable sealed shipping containers. Store lamps in an area and in a manner that will prevent breakage. Label the lamp storage area and each lamp container as hazardous waste. Provide a hazardous waste manifest and ship to an approved disposal site. The maximum quantity of lamps that can be stored on site before shipping is 1,000 lamps. Comply with all regulations of the State Pollution Control Agency.
- D. If light fixtures are to be removed from the jobsite intact, remove the light fixture from the jobsite as a unit. Do not remove lamps or ballasts on the jobsite.
- E. For disposed light fixtures, remove the lamps and ballasts from fluorescent light fixtures and high intensity discharge light fixtures. Dispose of the lamps and ballasts as indicated above.

END OF SECTION



PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Single conductor building wire.
- B. Wiring connectors.
- C. Electrical tape.
- D. Heat shrink tubing.
- E. Wire pulling lubricant.
- F. Cable ties.

1.02 RELATED REQUIREMENTS

- A. Section 26 0526 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.
- B. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013.
- B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2011.
- C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes; 2010 (Reapproved 2014).
- D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2014).
- E. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; 2010.
- F. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.
- G. NEMA WC 70 - Nonshielded Power Cable 2000 V or Less for the Distribution of Electrical Energy; 2009.
- H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- I. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.
- J. UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.
- K. UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.
- L. UL 486D - Sealed Wire Connector Systems; Current Edition, Including All Revisions.
- M. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:

1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
3. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

1.07 FIELD CONDITIONS

- A. Do not install or otherwise handle thermoplastic-insulated conductors at temperatures lower than 14 degrees F, unless otherwise permitted by manufacturer's instructions. When installation below this temperature is unavoidable, notify Architect and obtain direction before proceeding with work.
- B. Products: Furnish products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.01 CONDUCTOR AND CABLE APPLICATIONS

- A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.
- B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.
- C. Nonmetallic-sheathed cable is not permitted.
- D. Underground feeder and branch-circuit cable is not permitted.
- E. Service entrance cable is not permitted.
- F. Armored cable is not permitted.
- G. Metal-clad cable is not permitted.
  1. Metal clad (MC) cable may be used only for light fixture connections from the junction box to the light fixture above accessible ceilings.
- H. Manufactured wiring systems are not permitted.

2.02 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.

- C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- D. Comply with NEMA WC 70.
- E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
- F. Conductors for Grounding and Bonding: Also comply with Section 26 0526.
- G. Conductor Material:
  - 1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
  - 2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B 787M unless otherwise indicated.
  - 3. Tinned Copper Conductors: Comply with ASTM B33.
- H. Minimum Conductor Size:
  - 1. Branch Circuits: 12 AWG.
    - a. Exceptions:
      - 1) 20 A, 120 V circuits longer than 75 feet: 10 AWG, for voltage drop.
      - 2) 20 A, 120 V circuits longer than 150 feet: 8 AWG, for voltage drop.
  - 2. Control Circuits: 14 AWG.
- I. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- J. Conductor Color Coding:
  - 1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
  - 2. Color Coding Method: Integrally colored insulation.
    - a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.
  - 3. Color Code:
    - a. 240/120 V High-Leg Delta, 3 Phase, 4 Wire System:
      - 1) Phase A: Black.
      - 2) Phase B (High-Leg): Orange.
      - 3) Phase C: Blue.
      - 4) Neutral/Grounded: White.
    - b. Equipment Ground, All Systems: Green.
    - c. Travelers for 3-Way and 4-Way Switching: Pink.
    - d. For modifications or additions to existing wiring systems, comply with existing color code when existing code complies with NFPA 70 and is approved by the authority having jurisdiction.

- e. For control circuits, comply with manufacturer's recommended color code.

## 2.03 SINGLE CONDUCTOR BUILDING WIRE

### A. Manufacturers:

#### 1. Copper Building Wire:

- a. Cerro Wire LLC: [www.cerrowire.com](http://www.cerrowire.com).
- b. Encore Wire Corporation: [www.encorewire.com](http://www.encorewire.com).
- c. Southwire Company: [www.southwire.com](http://www.southwire.com).
- d. Or Equal.

### B. Description: Single conductor insulated wire.

### C. Conductor Stranding:

#### 1. Feeders and Branch Circuits:

- a. Size 10 AWG and Smaller: Solid.
- b. Size 8 AWG and Larger: Stranded.

#### 2. Control Circuits: Stranded.

### D. Insulation Voltage Rating: 600 V.

### E. Insulation:

#### 1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2.

## 2.04 WIRING CONNECTORS

### A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.

### B. Wiring Connectors for Splices and Taps:

- 1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.
- 2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or compression connectors.

### C. Wiring Connectors for Terminations:

- 1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
- 2. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.
- 3. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.
- 4. Provide motor pigtail connectors for connecting motor leads in order to facilitate disconnection.

5. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.
6. Stranded Conductors Size 10 AWG and Smaller: Use crimped terminals for connections to terminal screws.
7. Conductors for Control Circuits: Use crimped terminals for all connections.
- D. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.
- E. Do not use push-in wire connectors as a substitute for twist-on insulated spring connectors.
- F. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.
  1. Manufacturers:
    - a. 3M: [www.3m.com](http://www.3m.com).
    - b. Ideal Industries, Inc: [www.idealindustries.com](http://www.idealindustries.com).
    - c. NSI Industries LLC: [www.nsiindustries.com](http://www.nsiindustries.com).
- G. Mechanical Connectors: Provide bolted type or set-screw type.
  1. Manufacturers:
    - a. Burndy: [www.burndy.com](http://www.burndy.com).
    - b. IlSCO: [www.ilsco.com](http://www.ilsco.com).
    - c. Thomas & Betts Corporation: [www.tnb.com](http://www.tnb.com).
- H. Compression Connectors: Provide circumferential type or hex type crimp configuration.
  1. Manufacturers:
    - a. Burndy: [www.burndy.com](http://www.burndy.com).
    - b. IlSCO: [www.ilsco.com](http://www.ilsco.com).
    - c. Thomas & Betts Corporation: [www.tnb.com](http://www.tnb.com).
- I. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.
  1. Manufacturers:
    - a. Burndy: [www.burndy.com](http://www.burndy.com).
    - b. IlSCO: [www.ilsco.com](http://www.ilsco.com).
    - c. Thomas & Betts Corporation: [www.tnb.com](http://www.tnb.com).

## 2.05 WIRING ACCESSORIES

### A. Electrical Tape:

1. Manufacturers:

- a. 3M: [www.3m.com](http://www.3m.com).
- b. Plymouth Rubber Europa: [www.plymouthrubber.com](http://www.plymouthrubber.com).
2. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F.
3. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F and suitable for continuous temperature environment up to 221 degrees F.
4. Moisture Sealing Electrical Tape: Insulating mastic compound laminated to flexible, all-weather vinyl backing; minimum thickness of 90 mil.
- B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.
- C. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.
  1. Manufacturers:
    - a. 3M: [www.3m.com](http://www.3m.com).
    - b. American Polywater Corporation: [www.polywater.com](http://www.polywater.com).
    - c. Ideal Industries, Inc: [www.idealindustries.com](http://www.idealindustries.com).
- D. Cable Ties: Material and tensile strength rating suitable for application.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that work likely to damage wire and cable has been completed.
- C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.
- D. Verify that field measurements are as shown on the drawings.
- E. Verify that conditions are satisfactory for installation prior to starting work.

#### 3.02 PREPARATION

- A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

#### 3.03 INSTALLATION

- A. Circuiting Requirements:
  1. Unless dimensioned, circuit routing indicated is diagrammatic.
  2. When circuit destination is indicated and routing is not shown, determine exact routing required.

3. Arrange circuiting to minimize splices.
  4. Include circuit lengths required to install connected devices within 10 ft of location shown.
  5. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
  6. Maintain separation of wiring for emergency systems in accordance with NFPA 70.
  7. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are shown as separate, combining them together in a single raceway is permitted, under the following conditions:
    - a. Provide no more than six current-carrying conductors in a single raceway. Dedicated neutral conductors are considered current-carrying conductors.
    - b. Increase size of conductors as required to account for ampacity derating.
    - c. Size raceways, boxes, etc. to accommodate conductors.
  8. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among up to three single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.
- B. Install products in accordance with manufacturer's instructions.
- C. Install conductors and cable in a neat and workmanlike manner in accordance with NECA 1.
- D. Installation in Raceway:
1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
  2. Pull all conductors and cables together into raceway at same time.
  3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
  4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.
- E. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.
- F. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
1. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conductors and cables to lay on ceiling tiles.
  2. Installation in Vertical Raceways: Provide supports where vertical rise exceeds permissible limits.
- G. Install conductors with a minimum of 12 inches of slack at each outlet.

- H. Where conductors are installed in enclosures for future termination by others, provide a minimum of 5 feet of slack.
- I. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.
- J. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.
- K. Make wiring connections using specified wiring connectors.
  - 1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
  - 2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
  - 3. Do not remove conductor strands to facilitate insertion into connector.
  - 4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminants. Do not use wire brush on plated connector surfaces.
  - 5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
  - 6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- L. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
  - 1. Dry Locations: Use insulating covers specifically designed for the connectors or heat shrink tubing.
  - 2. Damp Locations: Use insulating covers specifically designed for the connectors or heat shrink tubing.
    - a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.
  - 3. Wet Locations: Use heat shrink tubing.
- M. Insulate ends of spare conductors using vinyl insulating electrical tape.
- N. Field-Applied Color Coding: Where vinyl color coding electrical tape is used in lieu of integrally colored insulation as permitted in Part 2 under "Color Coding", apply half overlapping turns of tape at each termination and at each location conductors are accessible.
- O. Color Code Legend: Provide identification label identifying color code for ungrounded conductors at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.
- P. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.



3.04 FIELD QUALITY CONTROL

- A. Correct deficiencies and replace damaged or defective conductors and cables.
- B. Inspect wire for physical damage and proper connection.
- C. Measure tightness of bolted connections and compare torque measurements with manufacturer's recommended values.
- D. Verify continuity of each branch circuit conductor.

END OF SECTION



## PART 1 GENERAL

### 1.01 SECTION INCLUDES

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.

### 1.02 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.
- B. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

### 1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

### 1.04 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instruction.
- B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
- C. Comply with UL 467.
- D. Comply with NECA's "Standard of Installation."

## PART 2 PRODUCTS

### 2.01 GROUNDING AND BONDING REQUIREMENTS

- A. Existing Work: Where existing grounding and bonding system components are indicated to be reused, they may be reused only where they are free from corrosion, integrity and continuity are verified, and where acceptable to the authority having jurisdiction.
- B. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- C. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
- D. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

E. Bonding and Equipment Grounding:

1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.
7. Provide bonding for interior metal piping systems in accordance with NFPA 70. This includes, but is not limited to:
  - a. Metal water piping where not already effectively bonded to metal underground water pipe used as grounding electrode.
  - b. Metal gas piping.

2.02 GROUNDING AND BONDING COMPONENTS

A. General Requirements:

1. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated.
2. Provide products listed and labeled as complying with UL 467 and IEEE 837 where applicable.

B. Conductors for Grounding and Bonding:

1. Use insulated copper conductors unless otherwise indicated.

C. Connectors for Grounding and Bonding:

1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467 and IEEE 837.
2. Unless otherwise indicated, use exothermic welded connections or irreversible compression connectors for underground, concealed and other inaccessible connections.
3. Unless otherwise indicated, use mechanical connectors, exothermic welded connections, or irreversible compression connectors for accessible connections.
4. Manufacturers - Mechanical and Compression Connectors:
  - a. Burndy: [www.burndy.com](http://www.burndy.com).

- b. Harger Lightning & Grounding: [www.harger.com](http://www.harger.com).
- c. Thomas & Betts , a member of the ABB Group: [www.tnb.com](http://www.tnb.com).
- 5. Manufacturers - Exothermic Welded Connections:
  - a. Burndy: [www.burndy.com](http://www.burndy.com).
  - b. Cadweld, a brand of Erico International Corporation: [www.erico.com](http://www.erico.com).
  - c. ThermOweld, a brand of Continental Industries, Inc: [www.thermoweld.com](http://www.thermoweld.com).

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Verify that conditions are satisfactory for installation prior to starting work.
- B. Verify existing conditions prior to beginning work.

#### 3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install grounding and bonding system components in a neat and workmanlike manner in accordance with NECA 1.
- C. Make grounding and bonding connections using specified connectors.
  - 1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
  - 2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
  - 3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
  - 4. Mechanical Connectors: Secure connections using silicone bronze hardware, according to manufacturer's recommended torque settings.
- D. Identify grounding and bonding system components in accordance with Section 26 0553.
- E. Comply with NEC
  - 1. Article 250 for types, sizes, and quantities of equipment grounding conductors, except where specific types, larger sizes, or more conductors than required by NEC are indicated.
- F. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing. Comply with NEC Article 250 for types, sizes, and quantities of equipment grounding conductors, except where specific types, larger sizes, or more conductors than required by NEC are indicated.
  - 1. Install equipment grounding conductor with circuit conductors for the items below in addition to those required by Code:
    - a. Feeders and branch circuits.

- b. Lighting circuits.
- c. Receptacle circuits.
- d. Single-phase motor or appliance branch circuits.
- e. Three-phase motor or appliance branch circuits.

G. Connections

1. General: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
2. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. Where these requirements are not available, use those specified in UL 486A and UL 486B.
3. Moisture Protection: Where insulated grounding conductors are connected to grounding rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

3.03 FIELD QUALITY CONTROL

- A. Inspect grounding and bonding system conductors and connections for tightness and proper installation.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Support and attachment components for equipment, conduit, cable, boxes, and other electrical work.

1.02 RELATED REQUIREMENTS

- A. Section 26 0534 - Conduit: Additional support and attachment requirements for conduits.
- B. Section 26 0537 - Boxes: Additional support and attachment requirements for boxes.

1.03 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2013.
- D. MFMA-4 - Metal Framing Standards Publication; 2004.
- E. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. UL 5B - Strut-Type Channel Raceways and Fittings; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
  - 2. Coordinate the work with other trades to provide additional framing and materials required for installation.
  - 3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
  - 4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
  - 5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 QUALITY ASSURANCE

- A. Comply with NFPA 70.
- B. Comply with applicable building code.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

A. General Requirements:

1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported with a minimum safety factor of 3. Include consideration for vibration, equipment operation, and shock loads where applicable.
4. Do not use products for applications other than as permitted by NFPA 70 and product listing.
5. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
6. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
  - a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
  - b. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
  - c. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

B. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.

1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
2. Conduit Clamps: Bolted type unless otherwise indicated.
3. Manufacturers:
  - a. Cooper Crouse-Hinds, a division of Eaton Corporation: [www.cooperindustries.com](http://www.cooperindustries.com).
  - b. Erico International Corporation: [www.erico.com](http://www.erico.com).
  - c. O-Z/Gedney, a brand of Emerson Industrial Automation: [www.emersonindustrial.com](http://www.emersonindustrial.com).
  - d. Thomas & Betts Corporation: [www.tnb.com](http://www.tnb.com).

C. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.



1. Comply with MFMA-4.
  2. Channel Material:
    - a. Indoor Dry Locations: Use painted steel, zinc-plated steel, or galvanized steel.
    - b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel.
  3. Minimum Channel Thickness: Steel sheet, 12 gage, 0.1046 inch.
  4. Minimum Channel Dimensions: 1-5/8 inch width by 13/16 inch height.
  5. Manufacturers:
    - a. Cooper B-Line, a division of Eaton Corporation: [www.cooperindustries.com](http://www.cooperindustries.com).
    - b. Thomas & Betts Corporation: [www.tnb.com](http://www.tnb.com).
    - c. Unistrut, a brand of Atkore International Inc: [www.unistrut.com](http://www.unistrut.com).
    - d. Source Limitations: Furnish channels (struts) and associated fittings, accessories, and hardware produced by a single manufacturer.
- D. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
1. Minimum Size, Unless Otherwise Indicated or Required:
    - a. Equipment Supports: 1/2 inch diameter.
    - b. Single Conduit up to 1 inch (27mm) trade size: 1/4 inch diameter.
    - c. Single Conduit larger than 1 inch (27mm) trade size: 3/8 inch diameter.
    - d. Trapeze Support for Multiple Conduits: 3/8 inch diameter.
    - e. Outlet Boxes: 1/4 inch diameter.
    - f. Luminaires: 1/4 inch diameter.
- E. Anchors and Fasteners:
1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
  2. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.
  3. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
  4. Hollow Masonry: Use toggle bolts.
  5. Steel: Use beam clamps, machine bolts, or welded threaded studs.
  6. Sheet Metal: Use sheet metal screws.
  7. Wood: Use wood screws.
  8. Plastic and lead anchors are not permitted.
  9. Manufacturers - Mechanical Anchors:
    - a. Hilti, Inc: [www.us.hilti.com](http://www.us.hilti.com).

- b. ITW Red Head, a division of Illinois Tool Works, Inc: [www.itwredhead.com](http://www.itwredhead.com).
- c. Powers Fasteners, Inc: [www.powers.com](http://www.powers.com).
- d. Simpson Strong-Tie Company Inc: [www.strongtie.com](http://www.strongtie.com).

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Verify that field measurements are as shown on the drawings.
- B. Verify that mounting surfaces are ready to receive support and attachment components.
- C. Verify that conditions are satisfactory for installation prior to starting work.

#### 3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install support and attachment components in a neat and workmanlike manner in accordance with NECA 1.
- C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- D. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
- E. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
- F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- G. Equipment Support and Attachment:
  - 1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
  - 2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
  - 3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
  - 4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- H. Conduit Support and Attachment: Also comply with Section 26 0534.
- I. Box Support and Attachment: Also comply with Section 26 0537.
- J. Secure fasteners according to manufacturer's recommended torque settings.
- K. Remove temporary supports.

#### 3.03 FIELD QUALITY CONTROL

- A. Inspect support and attachment components for damage and defects.

- B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- C. Correct deficiencies and replace damaged or defective support and attachment components.
- D. Install hangers and supports as required to adequately and securely support electrical system components, in a neat and workmanlike manner, as specified in NECA 1. Size metal framing system as required for the application and structural requirements.

END OF SECTION



PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum rigid metal conduit (RMC).
- B. Electrical metallic tubing (EMT).
- C. Conduit fittings.
- D. Accessories.
- E. Conduit, fittings and conduit bodies.

1.02 RELATED REQUIREMENTS

- A. Section 26 0529 - Hangers and Supports.
- B. Section 26 0537 - Boxes.
- C. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2005.
- B. ANSI C80.3 - American National Standard for Steel Electrical Metallic Tubing (EMT); 2005.
- C. ANSI C80.5 - American National Standard for Electrical Rigid Aluminum Conduit (ERAC); 2005.
- D. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.
- E. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2013.
- F. NECA 102 - Standard for Installing Aluminum Rigid Metal Conduit; 2004.
- G. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2012.
- H. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit; 2013.
- I. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing; 2015.
- J. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- K. UL 6A - Electrical Rigid Metal Conduit-Aluminum, Red Brass, and Stainless Steel; Current Edition, Including All Revisions.
- L. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.
- M. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.

2. Coordinate the arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
  3. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.
  4. Coordinate the work with other trades to provide roof penetrations that preserve the integrity of the roofing system and do not void the roof warranty.
  5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
- B. Sequencing:
1. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.
- 1.05 SUBMITTALS
- A. See Section 01300 - Submittals and Substitutions for submittal procedures.
  - B. Project Record Documents: Record actual routing for conduits installed underground, conduits embedded within concrete slabs, and conduits 2 inch (53 mm) trade size and larger.
- 1.06 QUALITY ASSURANCE
- A. Conform to requirements of NFPA 70.
  - B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and shown.
- 1.07 DELIVERY, STORAGE, AND HANDLING
- A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.
  - B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
- 1.08 DESIGN REQUIREMENTS
- A. Conduit Size: ANSI/NFPA 70 or as indicated on Drawings, whichever is larger.

## PART 2 PRODUCTS

- 2.01 CONDUIT APPLICATIONS
- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.
  - B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.
  - C. Exposed, Interior, Not Subject to Physical Damage: Use electrical metallic tubing (EMT).
  - D. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit.

1. Locations subject to physical damage include, but are not limited to:
  - a. Where exposed below 8 feet, except within electrical and communication rooms or closets.
  - b. Where exposed below 20 feet in warehouse areas.

E. Connections to Vibrating Equipment:

1. Dry Locations: Use flexible metal conduit.
2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit.
3. Maximum Length: 6 feet unless otherwise indicated.
4. Vibrating equipment includes, but is not limited to:
  - a. Transformers.
  - b. Motors.

2.02 CONDUIT REQUIREMENTS

- A. Existing Work: Where existing conduits are indicated to be reused, they may be reused only where they comply with specified requirements, are free from corrosion, and integrity is verified by pulling a mandrel through them.
- B. Communications Systems Conduits: Also comply with Section 27 1005.
- C. Fittings for Grounding and Bonding: Also comply with Section 26 0526.
- D. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.
- E. Provide products listed, classified, and labeled as suitable for the purpose intended.
- F. Minimum Conduit Size, Unless Otherwise Indicated:
  1. Branch Circuits: 1/2 inch trade size.
- G. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 ALUMINUM RIGID METAL CONDUIT (RMC)

- A. Description: NFPA 70, Type RMC aluminum rigid metal conduit complying with ANSI C80.5 and listed and labeled as complying with UL 6A.
- B. Fittings:
  1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  2. Material: Use aluminum.
  3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.04 ELECTRICAL METALLIC TUBING (EMT)

- A. Manufacturers:

1. Allied Tube & Conduit: [www.alliedeg.com](http://www.alliedeg.com).
  2. Republic Conduit: [www.republic-conduit.com](http://www.republic-conduit.com).
  3. Wheatland Tube Company: [www.wheatland.com](http://www.wheatland.com).
  4. Or Equal.
- B. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.
- C. Fittings:
1. Manufacturers:
    - a. Bridgeport Fittings Inc: [www.bptfittings.com](http://www.bptfittings.com).
    - b. O-Z/Gedney, a brand of Emerson Industrial Automation: [www.emersonindustrial.com](http://www.emersonindustrial.com).
    - c. Thomas & Betts Corporation: [www.tnb.com](http://www.tnb.com).
  2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  3. Material: Use steel.
    - a. Do not use die cast zinc fittings.
  4. Connectors and Couplings: Use compression (gland) or set-screw type.
    - a. Do not use indenter type connectors and couplings.
  5. Damp or Wet Locations (where permitted): Use fittings listed for use in wet locations.

## 2.05 COMMUNICATIONS SYSTEM CONDUITS

- A. The Electrical Contractor shall provide a complete communication raceway system as shown on drawings and in accordance with the requirements described herein.
- B. Conduit color shall be as specified in Section 26 05 53 Identification for Electrical Systems.
- C. Minimum conduit size shall be 3/4 inch or as indicated on the drawings. Conduit runs for communications systems shall be run in the most direct path, with the minimum amount of bends possible.
- D. Install conduit from outlet to a location adjacent to the cable tray above the nearest accessible ceiling.
- E. All conduit runs shall be provided with insulated bushings and a pull wire indicating the location of the opposite end.
- F. Install conduits with the following minimum clearances:
  1. 48 inches from motors, generators, frequency converters, transformers, x-ray equipment, and uninterruptible power systems.
  2. 12 inches from power conduits and cables and panelboards.
  3. 5 inches from fluorescent and high frequency lighting fixtures.



4. 6 inches from flues, hot water pipes, and steam pipes.
- G. Conceal conduit under floor slabs and within finished walls, ceilings, and floors except where specifically indicated to be exposed.
  1. Conduit may remain exposed to view in mechanical rooms, electrical rooms, and telecommunications rooms.
  2. Treat conduit in crawl spaces and under floor slabs as if exposed to view.
  3. Where exposed to view, install parallel with or at right angles to ceilings, walls, and structural members.
  4. Under floor slabs, locate conduit at 12 inches, minimum, below vapor retarder; seal penetrations of vapor retarder around conduit.
- H. Conduit bends shall be smooth, even, and free of kinks or other discontinuities that may have detrimental effects on pulling tension or cable integrity. Observe the following bend radii guidelines:
  1. For conduits with 2" or less internal diameter, the bend radius shall be at least 6 times the internal diameter.
  2. For conduits with greater than 2" internal diameter, the bend radius shall be at least 10 times the internal diameter.
- I. Pullboxes shall be installed in a convenient and accessible location and shall be shown on the Contractor's record drawings. Pull boxes shall be supported independently of the associated conduits. Size pullboxes per the NEC. Pullboxes for communications conduits shall be placed in sections of conduit that:
  1. Are 100 feet or more in length.
  2. Contain more than two 90 degree bends: Provide pullbox between sections with two bends or less.
  3. Contain reverse bends (between 100 and 180 degrees): Insert a pull point or pull box at each bend having an angle from 100 degrees to 180 degrees.
- J. A third bend in a conduit is acceptable in a pull section if the conduit capacity is derated by 15% or if one of the following is true:
  1. The total run is not longer than 33 feet.
  2. The conduit size is increased to the next trade size.
  3. One of the bends is within 12 inches of the cable feed end where cable is pushed around the first bend.
- K. Vertical riser conduits and sleeves shall terminate not less than 3 inches above and below the floor that they penetrate. Riser conduits and sleeves shall be reamed and bushed.
- L. Where drilling is necessary for vertical conduits, locate holes so as not to affect structural sections such as ribs or beams.
- M. Service entrance conduits and outside plant conduits shall be cut and installed as flush to the wall as possible and extend a minimum of 4 inches above the finished floor. Provide with a pull rope rated at a minimum of 200 lbs.

- N. Underground Service Entrance: Install conduit at least 18 inches below finish grade; encase in at least 3 inches thick concrete for at least 60 inches out from the building line.
- O. All penetrations through fire barrier walls or floors shall consist of a conduit sleeve and shall be sealed with an industry approved fire barrier caulk or compound reamed and bushed. All vertical/horizontal sleeves shall be sized according to station count passing through each. Sized for maximum 60 percent fill.
- P. All empty conduits located in communication closets or on backboards shall be sealed with a standard non-hardening duct seal compound to prevent the entrance of moisture and gases and to meet fire resistance requirements.

## 2.06 ACCESSORIES

- A. Pull Strings: Use nylon cord with average breaking strength of not less than 200 pound-force.
- B. Sealing Compound for Sealing Fittings: Listed for use with the particular fittings to be installed.
- C. Modular Seals for Conduit Penetrations: Rated for minimum of 40 psig; Suitable for the conduits to be installed.

## 2.07 FIRESTOP

- A. Provide a firestop system with an "F" rating as determined by UL 1479 or ASTM E814 which is equal to the time rating of construction being penetrated.
  - 1. For penetrations by non-combustible items including steel pipe, copper pipe, rigid steel conduit, and electrical metallic tubing (EMT), the following are acceptable:
    - a. Hilti FS 601 electrometric firestop sealant or Fs 605 HP firestop sealant.
    - b. 3M fire barrier CP25.
    - c. Nelson CLK firestop sealant
  - 2. For fire-rated construction joints and other gaps, the following may be used:
    - a. Hilti FS 601.
    - b. 3M fire barrier CP25.
    - c. Nelson CLK firestop sealant.
  - 3. For penetrations by non-combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable, or cable bundles, and plastic pipe (closed piping systems), the following are acceptable:
    - a. Hilti FS 611A intumescent firestop sealant.
    - b. 3M barrier CP 25.
    - c. 3M fire barrier FS-195 wrap strip.
    - d. Nelson FSP firestop putty, PCS pipe choke system.
  - 4. For large complex penetrations made to accommodate cable trays, multiple steel and copper pipes, electrical busways or raceways, the following are acceptable:

- a. Hilti FS 635, trowelable firestop compound.
- b. 3M fire barrier CS-195 composite sheet.
- c. Nelson CPS composite sheet, CMP firestop compound.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Verify that field measurements are as shown on drawings.
- B. Verify that mounting surfaces are ready to receive conduits.
- C. Verify that conditions are satisfactory for installation prior to starting work.
- D. Verify routing and termination locations of conduit prior to rough-in.
- E. Conduit routing is shown on drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

#### 3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install conduit in a neat and workmanlike manner in accordance with NECA 1.
- C. Install aluminum rigid metal conduit (RMC) in accordance with NECA 102.
- D. Conduit Routing:
  1. Unless dimensioned, conduit routing indicated is diagrammatic.
  2. When conduit destination is indicated and routing is not shown, determine exact routing required.
  3. Conceal all conduits unless specifically indicated to be exposed.
  4. Conduits in the following areas may be exposed, unless otherwise indicated:
    - a. Electrical rooms.
    - b. Mechanical equipment rooms.
    - c. Within joists in areas with no ceiling.
  5. Unless otherwise approved, do not route conduits exposed:
    - a. Across floors.
    - b. Across roofs.
    - c. Across top of parapet walls.
    - d. Across building exterior surfaces.
    - e. In any finished areas.
  6. Arrange conduit to maintain adequate headroom, clearances, and access.

7. Arrange conduit to provide no more than the equivalent of four 90 degree bends between pull points.
8. Route conduits above water and drain piping where possible.
9. Maintain minimum clearance of 6 inches between conduits and piping for other systems.
10. Maintain minimum clearance of 12 inches between conduits and hot surfaces. This includes, but is not limited to:
  - a. Heaters.
  - b. Hot water piping.
  - c. Flues.
11. Group parallel conduits in the same area together on a common rack.

E. Conduit Support:

1. Secure and support conduits in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.
2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
4. Use conduit strap to support single surface-mounted conduit.
  - a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.
5. Use metal channel (strut) with accessory conduit clamps to support multiple parallel surface-mounted conduits.
6. Use conduit clamp to support single conduit from beam clamp or threaded rod.
7. Use trapeze hangers assembled from threaded rods and metal channel (strut) with accessory conduit clamps to support multiple parallel suspended conduits.
8. Use non-penetrating rooftop supports to support conduits routed across rooftops (only where approved).
9. Use of spring steel conduit clips for support of conduits is permitted only as follows:
  - a. Support of electrical metallic tubing (EMT) up to 1 inch (27 mm) trade size concealed above accessible ceilings and within hollow stud walls.
10. Use of wire for support of conduits is not permitted.
11. Where conduit support intervals specified in NFPA 70 and NECA standards differ, comply with the most stringent requirements.

F. Connections and Terminations:

1. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.

2. Use suitable adapters where required to transition from one type of conduit to another.
3. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
4. Where spare conduits stub up through concrete floors and are not terminated in a box or enclosure, provide threaded couplings equipped with threaded plugs set flush with finished floor.
5. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
6. Secure joints and connections to provide maximum mechanical strength and electrical continuity.

G. Penetrations:

1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
2. Make penetrations perpendicular to surfaces unless otherwise indicated.
3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
4. Conceal bends for conduit risers emerging above ground.
5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
6. Provide suitable mechanical sleeves (link seal) where conduits penetrate exterior wall below grade.
7. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
8. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty.
9. Provide metal escutcheon plates for conduit penetrations exposed to public view.

H. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:

1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
2. Where calculated in accordance with NFPA 70 for rigid polyvinyl chloride (PVC) conduit installed above ground to compensate for thermal expansion and contraction.
3. Where conduits are subject to earth movement by settlement or frost.

I. Provide pull string in all empty conduits and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches at each end.

J. Provide grounding and bonding in accordance with Section 26 0526.

K. Identify conduits in accordance with Section 26 0553.

3.03 FIELD QUALITY CONTROL

- A. Correct deficiencies and replace damaged or defective conduits.

3.04 CLEANING

- A. Clean interior of conduits to remove moisture and foreign matter.

3.05 PROTECTION

- A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.
- B. All conduit in finished areas shall be installed concealed in walls, floors or ceilings unless noted otherwise on the drawings. Unfinished areas are considered mechanical rooms, electrical rooms and utility spaces only.
- C. Route exposed conduit parallel and perpendicular to walls.
- D. Route conduit installed above accessible ceilings parallel and perpendicular to walls.
- E. Route conduit continuous from outlet to outlet, outlet to cabinets, outlet to pull or junction boxes. Secure conduit to all boxes with locknuts and bushings in such manner that each system is mechanically and electrically continuous throughout.
- F. Install all conduit within the building except where specifically noted or shown otherwise on the drawings.
- G. Conduit systems must be installed complete before conductors are pulled in.
- H. Repair any damage done to insulation or interior vapor barrier.
- I. Fill conduits which can admit air to or release air from air plenums through the connecting conduit system with sealing compound.
- J. Seal around all conduits passing through partitions such as walls, floor slabs and other elements. For non-rated partitions, sealant to match surrounding surface. For rated partitions, provide fireproofing sealant which preserves the fire resistant rating of the partition. Use materials and methods as directed by the manufacturer of the fireproofing and approved by the Architect/Engineer. See Architectural drawings and existing building drawings for location of new and existing fire-rated partitions.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.
- B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches.
- C. Pull and junction boxes.

1.02 RELATED REQUIREMENTS

- A. Section 26 0529 - Hangers and Supports.
- B. Section 26 0534 - Conduit:
  - 1. Conduit bodies and other fittings.
  - 2. Additional requirements for locating boxes to limit conduit length and/or number of bends between pulling points.
- C. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.
- B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.
- C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2012.
- D. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; 2013.
- E. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports; 2013.
- F. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
  - 2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
  - 3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
  - 4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.

5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
6. Coordinate the work with other trades to preserve insulation integrity.
7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
8. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

- A. See Section 01300 - Submittals and Substitutions.
- B. Project Record Documents: Record actual locations and mounting heights of outlet, pull, and junction boxes on project record documents.

1.06 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 BOXES

- A. General Requirements:
  1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
  2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
  3. Provide products listed, classified, and labeled as suitable for the purpose intended.
  4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
  5. Provide grounding terminals within boxes where equipment grounding conductors terminate.
- B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:
  1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
  2. Use cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
  3. Use cast iron boxes or cast aluminum boxes where exposed galvanized steel rigid metal conduit is used.
  4. Use suitable masonry type boxes where flush-mounted in masonry walls.



5. Use raised covers suitable for the type of wall construction and device configuration where required.
6. Use shallow boxes where required by the type of wall construction.
7. Do not use "through-wall" boxes designed for access from both sides of wall.
8. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
9. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
10. Minimum Box Size, Unless Otherwise Indicated:
  - a. Wiring Devices: 4 inch square by 1-1/2 inch deep (100 by 38 mm) trade size.
  - b. Communications Systems Outlets: 4 inch square by 2-1/8 inch (100 by 54 mm) trade size.
  - c. Ceiling Outlets: 4 inch octagonal or square by 1-1/2 inch deep (100 by 38 mm) trade size.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Verify that field measurements are as shown on drawings.
- B. Verify that mounting surfaces are ready to receive boxes.
- C. Verify that conditions are satisfactory for installation prior to starting work.
- D. Verify locations of floor boxes and outlets in offices and work areas prior to rough-in.

#### 3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.
- E. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.
- F. Box Locations:
  1. Locate boxes to be accessible. Provide access panels as required where approved by the Architect.
  2. Unless dimensioned, box locations indicated are approximate.
  3. Locate boxes as required for devices installed under other sections or by others.

- a. Switches, Receptacles, and Other Wiring Devices: Comply with Section 26 2726.
    - b. Communications Systems Outlets: Comply with Section 27 1005.
  4. Locate boxes so that wall plates do not span different building finishes.
  5. Locate boxes so that wall plates do not cross masonry joints.
  6. Unless otherwise indicated, where multiple outlet boxes are installed at the same location at different mounting heights, install along a common vertical center line.
  7. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 26 0534.
  8. Locate junction and pull boxes in the following areas, unless otherwise indicated or approved by the Architect:
    - a. Concealed above accessible suspended ceilings.
    - b. Within joists in areas with no ceiling.
    - c. Electrical rooms.
    - d. Mechanical equipment rooms.
- G. Box Supports:
1. Secure and support boxes in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.
  2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
  3. Installation Above Suspended Ceilings: Do not provide support from ceiling grid or ceiling support system.
  4. Use far-side support to secure flush-mounted boxes supported from single stud in hollow stud walls. Repair or replace supports for boxes that permit excessive movement.
- H. Install boxes plumb and level.
- I. Install firestopping to preserve fire resistance ratings of partitions and other elements.
- J. Close unused box openings.
- K. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.
- L. Provide grounding and bonding in accordance with Section 26 0526.
- M. All boxes shall be installed flush in finished spaces unless noted otherwise. Unfinished spaces include mechanical, electrical and utility rooms only.
- N. Install boxes securely, in a neat and workmanlike manner, as specified in NECA 1.
- O. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections, and as required by NFPA 70.

- P. Set wall mounted boxes at elevations to accommodate mounting heights indicated on the drawings or specified unless noted otherwise.
- Q. Electrical boxes are shown on Drawings in approximate locations unless dimensioned.
  - 1. Adjust box locations up to 10 feet if required to accommodate intended purpose.
- R. Maintain headroom and present neat mechanical appearance.
- S. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
- T. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes and mechanical radiation.
- U. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.
- V. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.
- W. Use flush mounting outlet box in finished areas.
- X. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.
- Y. Use adjustable steel channel fasteners for hung ceiling outlet box.
- Z. Support boxes independently of conduit, except cast box that is connected to two rigid metal conduits both supported within 12 inches of box.
- AA. Use surface mounted 4-inch square box with matching raised cover on exposed conduit runs.
- AB. Use gang box where more than one device is mounted together. Do not use sectional box. Do not use handy box.
- AC. Use cast outlet box in exterior locations exposed to the weather and wet locations.
- AD. Install outlets in similar rooms in the same relative location in each room.
- AE. Mounting heights indicated on Drawings are to center line of outlet unless indicated otherwise.
- AF. Mount duplex receptacle outlets noted to be "A.C." (above counter) 3 inches above the top of the countertop backsplash. Adjust outlet mounting height to agree with required location for equipment served.
- AG. Pull boxes and junction boxes are not indicated on Drawings except for special requirements. Install as required to facilitate pulling wire. Size as required by National Electric Code. Install above removable ceilings, electrical rooms, utility rooms or storage areas in accessible locations. Installation in finished spaces not permitted without approval of the Architect/Engineer.
- AH. Do not mount junction boxes or pull boxes to duct work, ceiling system or other piping. Mount from structural system only. Mount independent of conduit system. Junction boxes supported only from conduit system will not be permitted.
- AI. Label all junction box covers with panelboard name and circuit numbers for circuits in junction box. Label all junction box covers with the type of communication systems contained within; example: "Nurse Call," "Security," etc. See section 26 0553 - Electrical Identification.

3.03 ADJUSTING

- A. Adjust floor boxes flush with finish flooring material.
- B. Adjust flush-mounting outlets to make front flush with finished wall material.
- C. Install knockout closures in unused box openings.

3.04 CLEANING

- A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

END OF SECTION

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

- A. Electrical identification requirements.
- B. Identification nameplates and labels.
- C. Device and Junction Box Labels

### 1.02 REFERENCE STANDARDS

- A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

### 1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Verify final designations for equipment, systems, and components to be identified prior to fabrication of identification products.
- B. Sequencing:
  - 1. Do not conceal items to be identified, in locations such as above suspended ceilings, until identification products have been installed.
  - 2. Do not install identification products until final surface finishes and painting are complete.

### 1.04 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.

### 1.05 FIELD CONDITIONS

- A. Do not install adhesive products when ambient temperature is lower than recommended by manufacturer.
- B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and shown.

## PART 2 PRODUCTS

### 2.01 IDENTIFICATION REQUIREMENTS

- A. Existing Work: Unless specifically excluded, identify existing elements to remain that are not already identified in accordance with specified requirements.
- B. Identification for Equipment:
  - 1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
    - a. Enclosed switches:
      - 1) Identify voltage and phase.
      - 2) Identify power source and circuit number. Include location when not within sight of equipment.
      - 3) Identify load(s) served. Include location when not within sight of equipment.
- C. Identification for Boxes:

1. Use color coded boxes to identify specified systems.
2. Use identification labels or handwritten text using indelible marker to identify circuits enclosed.
  - a. For exposed boxes in public areas, use only identification labels.

## 2.02 MANUFACTURERS

- A. Brady Corporation: [www.bradycorp.com](http://www.bradycorp.com).
- B. Seton Identification Products: [www.seton.com/aec](http://www.seton.com/aec).
- C. HellermannTyton: [www.hellermannityton.com](http://www.hellermannityton.com).
- D. Or Equal.

## 2.03 IDENTIFICATION NAMEPLATES AND LABELS

### A. Identification Nameplates:

1. Manufacturers:
  - a. Brimar Industries, Inc: [www.brimar.com](http://www.brimar.com).
  - b. Kolbi Pipe Marker Co: [www.kolbipipemarkers.com](http://www.kolbipipemarkers.com).
  - c. Seton Identification Products: [www.seton.com](http://www.seton.com).
2. Materials:
  - a. Indoor Clean, Dry Locations: Use plastic nameplates.
  - b. Outdoor Locations: Use plastic, stainless steel, or aluminum nameplates suitable for exterior use.
3. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch; engraved text.
4. Stainless Steel Nameplates: Minimum thickness of 1/32 inch; engraved or laser-etched text.
5. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch; engraved or laser-etched text.
6. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch high; Four, located at corners for larger sizes.

### B. Identification Labels:

1. Manufacturers:
  - a. Brady Corporation: [www.bradyid.com](http://www.bradyid.com).
  - b. Brother International Corporation: [www.brother-usa.com](http://www.brother-usa.com).
  - c. Panduit Corp: [www.panduit.com](http://www.panduit.com).
2. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.

3. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.
- C. Format for Equipment Identification:
  1. Minimum Size: 1 inch by 2.5 inches.
  2. Legend:
    - a. System designation where applicable:
      - 1) Emergency Power System: Identify with text "EMERGENCY".
      - 2) Fire Alarm System: Identify with text "FIRE ALARM".
    - b. Equipment designation or other approved description.
    - c. Other information as indicated.
  3. Text: All capitalized unless otherwise indicated.
  4. Minimum Text Height:
    - a. System Designation: 1 inch.
    - b. Equipment Designation: 1/2 inch.
    - c. Other Information: 1/4 inch.
    - d. Exception: Provide minimum text height of 1 inch for equipment located more than 10 feet above floor or working platform.
  5. Color:
    - a. Normal Power System: White text on black background.
- D. Format for Control Device Identification:
  1. Minimum Size: 3/8 inch by 1.5 inches.
  2. Legend: Load controlled or other designation indicated.
  3. Text: All capitalized unless otherwise indicated.
  4. Minimum Text Height: 3/16 inch.
  5. Color: Black text on clear background.

## PART 3 EXECUTION

### 3.01 PREPARATION

- A. Clean surfaces to receive adhesive products according to manufacturer's instructions.
- B. Degrease and clean surfaces to receive nameplates and labels.

### 3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:

1. Surface-Mounted Equipment: Enclosure front.
  2. Interior Components: Legible from the point of access.
  3. Boxes: Outside face of cover.
  4. Conductors and Cables: Legible from the point of access.
- C. Install identification products centered, level, and parallel with lines of item being identified.
- D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.
- E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.
- F. Mark all handwritten text, where permitted, to be neat and legible.

### 3.03 FIELD QUALITY CONTROL

- A. Replace self-adhesive labels and markers that exhibit bubbles, wrinkles, curling or other signs of improper adhesion.
- B. Provide self-adhesive labels on all receptacles by identifying the panel name and circuit number, example: H1-24.
- C. Provide self-adhesive labels on all junction box covers to identify the circuits contained within for all power circuits or the system contained within for all communications systems. Example: 'Paging System'.

END OF SECTION



PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Lighting and appliance panelboards.
- B. Overcurrent protective devices for panelboards.

1.02 RELATED REQUIREMENTS

- A. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- B. Section 26 0529 - Hangers and Supports.
- C. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service; Federal Specification; Revision E, 2013.
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.
- C. NECA 407 - Standard for Installing and Maintaining Panelboards; 2009.
- D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- E. NEMA PB 1 - Panelboards; 2011.
- F. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less; 2013.
- G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- I. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- J. UL 67 - Panelboards; Current Edition, Including All Revisions.
- K. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.
- L. UL 869A - Reference Standard for Service Equipment; Current Edition, Including All Revisions.
- M. UL 943 - Ground-Fault Circuit-Interruption; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.

2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
4. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

#### 1.05 SUBMITTALS

- A. See Section 01300 - Submittals and Substitutions for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for panelboards, enclosures, overcurrent protective devices, and other installed components and accessories.
  1. Include characteristic trip curves for each type and rating of overcurrent protective device upon request.
- C. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, overcurrent protective device arrangement and sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.
  1. Include dimensioned plan and elevation views of panelboards and adjacent equipment with all required clearances indicated.
  2. Include wiring diagrams showing all factory and field connections.
  3. Clearly indicate whether proposed short circuit current ratings are fully rated or, where acceptable, series rated systems.
- D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- E. Project Record Documents: Record actual installed locations of panelboards and actual installed circuiting arrangements.
- F. Maintenance Data: Include information on replacement parts and recommended maintenance procedures and intervals.

#### 1.06 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years documented experience.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store panelboards in accordance with manufacturer's instructions and NECA 407.
- B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

- C. Handle carefully in accordance with manufacturer's written instructions to avoid damage to panelboard internal components, enclosure, and finish.

#### 1.08 FIELD CONDITIONS

- A. Maintain ambient temperature within the following limits during and after installation of panelboards:
  - 1. Panelboards Containing Circuit Breakers: Between 23 degrees F and 104 degrees F.
- B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

### PART 2 PRODUCTS

#### 2.01 MANUFACTURERS

- A. Siemens Industry, Inc: [www.usa.siemens.com](http://www.usa.siemens.com).
- B. Eaton Corporation; Cutler-Hammer Products: [www.eaton.com](http://www.eaton.com).
- C. Schneider Electric; Square D Products: [www.schneider-electric.us](http://www.schneider-electric.us).
- D. Source Limitations: Furnish panelboards and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.

#### 2.02 PANELBOARDS - GENERAL REQUIREMENTS

- A. Provide products listed, classified, and labeled as suitable for the purpose intended.
- B. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
  - 1. Altitude: Less than 6,600 feet.
  - 2. Ambient Temperature:
    - a. Panelboards Containing Circuit Breakers: Between 23 degrees F and 104 degrees F.
- C. Short Circuit Current Rating:
  - 1. Provide panelboards with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.
  - 2. Listed series ratings are acceptable only where specifically indicated.
- D. Panelboards Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.
- E. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.
- F. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.
- G. Bussing: Sized in accordance with UL 67 temperature rise requirements.
  - 1. Provide fully rated neutral bus unless otherwise indicated, with a suitable lug for each feeder or branch circuit requiring a neutral connection.

2. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.
3. Provide separate isolated/insulated ground bus where indicated or where isolated grounding conductors are provided.
- H. Conductor Terminations: Suitable for use with the conductors to be installed.
- I. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
  1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
    - a. Indoor Clean, Dry Locations: Type 1.
    - b. Outdoor Locations: NEMA 3R/12.
  2. Boxes: Galvanized steel unless otherwise indicated.
    - a. Provide wiring gutters sized to accommodate the conductors to be installed.
    - b. Increase gutter space as required where sub-feed lugs, feed-through lugs, gutter taps, or oversized lugs are provided.
    - c. Provide removable end walls for NEMA Type 1 enclosures.
  3. Fronts:
    - a. Fronts for Surface-Mounted Enclosures: Same dimensions as boxes.
    - b. Finish for Painted Steel Fronts: Manufacturer's standard grey unless otherwise indicated.
  4. Lockable Doors: All locks keyed alike unless otherwise indicated.
- J. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.
- K. Multi-Section Panelboards: Provide enclosures of the same height, with feed-through lugs or sub-feed lugs and feeders as indicated or as required to interconnect sections.
- L. Provide the following features and accessories where indicated or where required to complete installation:
  1. Sub-feed lugs.

## 2.03 LIGHTING AND APPLIANCE PANELBOARDS

- A. Description: Panelboards complying with NEMA PB 1, lighting and appliance branch circuit type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.
- B. Conductor Terminations:
  1. Main and Neutral Lug Material: Copper, suitable for terminating copper conductors only.
  2. Main and Neutral Lug Type: Mechanical.
- C. Bussing:

1. Phase Bus Connections: Arranged for sequential phasing of overcurrent protective devices.
2. Phase and Neutral Bus Material: Copper.
3. Ground Bus Material: Copper.
- D. Circuit Breakers: Thermal magnetic bolt-on type unless otherwise indicated.
  1. Minimum Integrated Short Circuit Rating: As indicated. Panelboard shall be fully rated as an assembly, series rating within the panelboard or with upstream devices not allowed.
    - a. 240 Volt Panelboards: 10,000 amperes rms symmetrical.
  2. Do not use tandem circuit breakers.
- E. Enclosures:
  1. Provide surface-mounted enclosures as indicated. NEMA PB 1, Type 1.
  2. Cabinet Box: 6 inches deep, 20 inches wide for 240 volt and less panelboards, 20 inches wide for 480 volt panelboards.
  3. Fronts: Provide door-in-door trim with hinged cover for access to load terminals and wiring gutters, and separate lockable hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.
  4. Provide clear plastic circuit directory holder mounted on inside of door.

## 2.04 OVERCURRENT PROTECTIVE DEVICES

### A. Molded Case Circuit Breakers:

1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
2. Interrupting Capacity:
  - a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
    - 1) 10,000 rms symmetrical amperes at 240 VAC or 208 VAC.
  - b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
3. Conductor Terminations:
  - a. Provide mechanical lugs unless otherwise indicated.
  - b. Lug Material: Copper, suitable for terminating copper conductors only.
4. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.
  - a. Provide field-adjustable magnetic instantaneous trip setting for circuit breaker frame sizes 225 amperes and larger.
5. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.

6. Provide the following circuit breaker types where indicated:
  - a. Ground Fault Circuit Interrupter (GFCI) Circuit Breakers: Listed as complying with UL 943, class A for protection of personnel.
  - b. Ground Fault Equipment Protection Circuit Breakers: Designed to trip at 30 mA for protection of equipment.
7. Provide listed switching duty rated circuit breakers with SWD marking for all branch circuits serving fluorescent lighting.
8. Provide listed high intensity discharge lighting rated circuit breakers with HID marking for all branch circuits serving HID lighting.
9. Do not use tandem circuit breakers.
10. Do not use handle ties in lieu of multi-pole circuit breakers.
11. Provide multi-pole circuit breakers for multi-wire branch circuits as required by NFPA 70.
12. Provide the following features and accessories where indicated or where required to complete installation:
  - a. Handle Pad-Lock Provision: For locking circuit breaker handle in OFF position.

2.05 SOURCE QUALITY CONTROL

- A. Factory test panelboards according to NEMA PB 1.

2.06 MOUNTING BOARDS

- A. Grade AC fire resistant plywood, 3/4 inch thick, gray paint finish.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as shown on the drawings.
- B. Verify that the ratings and configurations of the panelboards and associated components are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive panelboards.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install panelboards securely, in a neat and workmanlike manner in accordance with NECA 1 (general workmanship), NECA 407 (panelboards), and NEMA PB 1.1.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide required supports in accordance with Section 26 0529.
- E. Install panelboards plumb.

- F. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches above the floor or working platform.
- G. Provide grounding and bonding in accordance with Section 26 0526.
  - 1. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on isolated/insulated ground bus.
  - 2. Terminate branch circuit isolated grounding conductors on isolated/insulated ground bus only. Do not terminate on solidly bonded equipment ground bus.
- H. Install all field-installed branch devices, components, and accessories.
- I. Where accessories are not self-powered, provide control power source as indicated or as required to complete installation.
- J. Multi-Wire Branch Circuits: Group grounded and ungrounded conductors together in the panelboard as required by NFPA 70.
- K. Set field-adjustable circuit breaker tripping function settings as directed.
- L. Set field-adjustable ground fault protection pickup and time delay settings as directed.
- M. Height: 6 feet to top of panelboard; install panelboards taller than 6 feet with bottom no more than 4 inches above floor.
- N. Provide filler plates to cover unused spaces in panelboards.
- O. Provide circuit breaker lock-on devices to prevent unauthorized personnel from de-energizing essential loads where indicated. Also provide for the following:
  - 1. Emergency and night lighting circuits.
  - 2. Fire detection and alarm circuits.
  - 3. Communications equipment circuits.
- P. Identify panelboards in accordance with Section 26 0553.
- Q. Provide computer-generated circuit directory for each lighting and appliance panelboard and each power distribution panelboard provided with a door, clearly and specifically indicating the loads served. Identify spares and spaces.
- R. Provide identification nameplate for each power distribution panelboard branch device in accordance with Section 26 0553, clearly and specifically indicating the loads served.
- S. Provide identification nameplate for each panelboard in accordance with Section 26 0553.
- T. Provide arc flash warning labels in accordance with NFPA 70.
- U. Provide floor markings to clearly indicate required working clearances where indicated or where required by the authority having jurisdiction.
- V. Provide spare conduits out of each recessed panelboard to an accessible location above ceiling. Identify each as SPARE.
  - 1. Minimum spare conduits: 5 empty 1 inch.
- W. Ground and bond panelboard enclosure according to Section 26 0526.

- X. Dress conductors within panelboard and bundle with nylon cable ties.
- Y. Tighten all lugs and bolts to manufacturer's instructions.
- Z. Provide mounting board for all surface mounted panelboards. Minimum size of 1-1/2 times the width and height of panelboard. Mount securely to wall.

### 3.03 FIELD QUALITY CONTROL

- A. Ground Fault Protection Systems: Test in accordance with manufacturer's instructions as required by NFPA 70.
- B. Test GFCI circuit breakers to verify proper operation.
- C. Correct deficiencies and replace damaged or defective panelboards or associated components.

### 3.04 ADJUSTING

- A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.
- B. Adjust alignment of panelboard fronts.
- C. Load Balancing: For each panelboard, rearrange circuits such that the difference between each measured steady state phase load does not exceed 20 percent and adjust circuit directories accordingly. Maintain proper phasing for multi-wire branch circuits.

### 3.05 CLEANING

- A. Clean dirt and debris from panelboard enclosures and components according to manufacturer's instructions.
- B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION



PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical connections to Division 22 and 23 mechanical equipment.

1.02 RELATED REQUIREMENTS

- A. Section 26 0534 - Conduit.
- B. Section 26 0519 - Low Voltage Conductors and Cables.
- C. Section 26 0537 - Boxes.

1.03 REFERENCE STANDARDS

- A. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (R 2010).
- B. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2012.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.
  - 2. Determine connection locations and requirements.
- B. Sequencing:
  - 1. Install rough-in of electrical connections before installation of equipment is required.
  - 2. Make electrical connections before required start-up of equipment.

1.05 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Products: Listed, classified, and labeled as suitable for the purpose intended.

1.06 COORDINATION

- A. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.
- B. Determine connection locations and requirements.
- C. Sequence rough-in of electrical connections to coordinate with installation of equipment.
- D. Sequence electrical connections to coordinate with start-up of equipment.
- E. Install controllers and disconnect switches in mechanical rooms in accessible locations. Coordination installation locations with Division 22 or 23 contractor.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. Cords and Caps: NEMA WD 6; match receptacle configuration at outlet provided for equipment.
  - 1. Colors: Conform to NEMA WD 1.
  - 2. Cord Construction: NFPA 70, Type SO, multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
  - 3. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.
- B. Flexible Conduit: As specified in Section 26 0534.
  - 1. Provide flexible conduit connections to equipment that must be removed for repair or maintenance.
  - 2. Where moist conditions are encountered such as in dishwashing areas, provide PVC jacketed flexible conduit.
- C. Wire and Cable: As specified in Section 26 0519.
- D. Boxes: As specified in Section 26 0537.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that equipment is ready for electrical connection, wiring, and energization.
- B. Verify mounting locations for controllers and disconnect switches. Coordinate with Division 22 and 23 equipment locations.
- C. Verify rough-in locations of all electrical materials in elevator pit and machine room with the elevator equipment supplier before installation.
- D. Provide necessary temporary connections to facilitate elevator testing.

### 3.02 ELECTRICAL CONNECTIONS

- A. Make electrical connections in accordance with equipment manufacturer's instructions.
- B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.
- C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered. Do not use wire having a rating less than 90 degrees C.
- D. Provide receptacle outlet to accommodate connection with attachment plug.
- E. Provide cord and cap where field-supplied attachment plug is required.
- F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.

- H. Install terminal block jumpers to complete equipment wiring requirements.
- I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.
- J. Review floor plan drawings and motor and equipment schedule on the plans. The floor plans indicate the location of the equipment only, the schedule calls out all connection, disconnect and controller requirements.
- K. Provide a disconnecting means within sight of all motors and equipment as required by the latest edition of the NEC.

END OF SECTION



PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wall switches.
- B. Wall dimmers.
- C. Receptacles.
- D. Wall plates.

1.02 RELATED REQUIREMENTS

- A. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- B. Section 26 0537 - Boxes.
- C. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- D. Section 26 0923 - Lighting Control Devices: Devices for automatic control of lighting, including occupancy sensors, in-wall time switches, and in-wall interval timers.
- E. Section 27 1005 - Structured Telecommunications Cabling and Enclosures: Voice and data jacks.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.
- B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.
- C. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (R 2010).
- D. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2012.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. UL 20 - General-Use Snap Switches; Current Edition, Including All Revisions.
- G. UL 498 - Attachment Plugs and Receptacles; Current Edition, Including All Revisions.
- H. UL 514D - Cover Plates for Flush-Mounted Wiring Devices; Current Edition, Including All Revisions.
- I. UL 943 - Ground-Fault Circuit-Interrupters; Current Edition, Including All Revisions.
- J. UL 1472 - Solid-State Dimming Controls; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Coordinate the placement of outlet boxes with millwork, furniture, equipment, etc. installed under other sections or by others.
  - 2. Coordinate wiring device ratings and configurations with the electrical requirements of actual equipment to be installed.

3. Coordinate the placement of outlet boxes for wall switches with actual installed door swings.
4. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
5. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

B. Sequencing:

1.05 SUBMITTALS

- A. See Section 01300 - Submittals and Substitutions for procedures.
- B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.
  1. Wall Dimmers: Include derating information for ganged multiple devices.
- C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- D. Operation and Maintenance Data:
  1. Wall Dimmers: Include information on operation and setting of presets.
  2. GFI Receptacles: Include information on status indicators and testing procedures and intervals.
- E. Project Record Documents: Record actual installed locations of wiring devices.

1.06 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Products: Listed, classified, and labeled as suitable for the purpose intended.

1.07 DELIVERY, STORAGE, AND PROTECTION

- A. Store in a clean, dry space in original manufacturer's packaging until ready for installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Hubbell Incorporated: [www.hubbell-wiring.com](http://www.hubbell-wiring.com).
- B. Leviton Manufacturing Company, Inc: [www.leviton.com](http://www.leviton.com).
- C. Lutron Electronics Company, Inc: [www.lutron.com](http://www.lutron.com).
- D. Pass & Seymour, a brand of Legrand North America, Inc: [www.legrand.us](http://www.legrand.us)
- E. Cooper Wiring Devices: [www.cooperwiringdevices.com](http://www.cooperwiringdevices.com).
- F. Approved equal.
- G. Source Limitations: Where possible, for each type of wiring device furnish products produced by a single manufacturer and obtained from a single supplier.

## 2.02 WIRING DEVICE APPLICATIONS

- A. Provide wiring devices suitable for intended use and with ratings adequate for load served.
- B. For single receptacles installed on an individual branch circuit, provide receptacle with ampere rating not less than that of the branch circuit.
- C. Provide weather resistant GFI receptacles with specified weatherproof covers for all receptacles installed outdoors or in damp or wet locations.
- D. Provide tamper resistant receptacles for all receptacles installed in dwelling units.
- E. Provide GFI protection for all receptacles installed within 6 feet of sinks.
- F. Provide GFI protection for all receptacles installed in kitchens.
- G. Provide GFI protection for all receptacles serving electric drinking fountains.
- H. Unless noted otherwise, do not use combination switch/receptacle devices.

## 2.03 WALL SWITCHES

- A. All Wall Switches: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20; types as indicated on the drawings.
  - 1. Wiring Provisions: Terminal screws for side wiring and screw actuated binding clamp for back wiring with separate ground terminal screw.
- B. Standard Wall Switches: Industrial specification grade, 20 A, 120/277 V with standard toggle type switch actuator and maintained contacts; single pole single throw, double pole single throw, three way, or four way as indicated on the drawings. Rated 1 horsepower at 120 volts, 2 horsepower at 277 volts

## 2.04 WALL DIMMERS

- A. Manufacturers:
  - 1. Leviton Manufacturing Company, Inc; Renior Series: [www.leviton.com](http://www.leviton.com). Renior Series.
- B. All Wall Dimmers: Solid-state with continuous full-range even control following square law dimming curve, integral radio frequency interference filtering, power failure preset memory, air gap switch accessible without removing wall plate, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 1472; types and ratings suitable for load controlled as indicated on the drawings. leviton Renoir series or equal.
- C. Control: Slide control type with separate on/off switch.
- D. Power Rating, Unless Otherwise Indicated or Required to Control the Load Indicated on the Drawings:
  - 1. Magnetic Low-Voltage: 600 VA.
  - 2. Electronic Low-Voltage: 400 VA.

## 2.05 RECEPTACLES

- A. All Receptacles: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498; types as indicated on the drawings.

1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
  2. NEMA configurations specified are according to NEMA WD 6.
- B. Convenience Receptacles:
1. Standard Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R; single or duplex as indicated on the drawings.
  2. Weather Resistant Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R, , listed and labeled as weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations; single or duplex as indicated on the drawings.
- C. GFI Receptacles:
1. All GFI Receptacles: Provide with feed-through protection, light to indicate ground fault tripped condition and loss of protection, and list as complying with UL 943, class A.
    - a. Provide test and reset buttons of same color as device.
  2. Standard GFI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style.
  3. Weather Resistant GFI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations.

## 2.06 WALL PLATES

- A. All Wall Plates: Comply with UL 514D.
1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
  2. Size: Standard.
  3. Screws: Metal with slotted heads finished to match wall plate finish.
- B. Stainless Steel Wall Plates: Brushed satin finish, Type 302 stainless steel.
- C. Galvanized Steel Wall Plates: Rounded corners and edges, with corrosion resistant screws.
- D. Weatherproof Covers for Damp Locations: Gasketed, cast aluminum, with self-closing hinged cover and corrosion-resistant screws; listed as suitable for use in wet locations with cover closed.
- E. Weatherproof Covers for Wet Locations: Gasketed, cast aluminum, with hinged lockable cover and corrosion-resistant screws; listed as suitable for use in wet locations while in use with attachment plugs connected. Red Dot model CKSGV or equal.
- F. Provide labeling of plate with panelboard and circuit number.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that field measurements are as shown on the drawings.



- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.
- C. Verify that wall openings are neatly cut and will be completely covered by wall plates.
- D. Verify that final surface finishes are complete, including painting.
- E. Verify that floor boxes are adjusted properly.
- F. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.
- G. Verify that conditions are satisfactory for installation prior to starting work.

### 3.02 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

### 3.03 INSTALLATION

- A. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.
- B. Coordinate locations of outlet boxes provided under Section 26 0537 as required for installation of wiring devices provided under this section.
  - 1. Mounting Heights: Unless otherwise indicated, as follows:
    - a. Wall Switches: 48 inches above finished floor.
    - b. Wall Dimmers: 48 inches above finished floor.
    - c. Receptacles: 18 inches above finished floor or 6 inches above counter.
  - 2. Orient outlet boxes for vertical installation of wiring devices unless otherwise indicated.
  - 3. Provide minimum of 24 inches horizontal separation between flush mounted outlet boxes installed on opposite sides of fire rated walls.
  - 4. Where multiple receptacles, wall switches, or wall dimmers are installed at the same location and at the same mounting height, gang devices together under a common wall plate.
  - 5. Provide separate outlet boxes for wiring devices connected to emergency power and normal power systems.
  - 6. Unless otherwise indicated, provide separate outlet boxes for line voltage and low voltage devices.
  - 7. Locate wall switches on strike side of door with edge of wall plate 3 inches from edge of door frame. Where locations are indicated otherwise, notify Architect to obtain direction prior to proceeding with work.
  - 8. Locate receptacles for electric drinking fountains concealed behind drinking fountain according to manufacturer's instructions.
  - 9. Locate outlet boxes so that wall plate does not span different building finishes.

10. Locate outlet boxes so that wall plate does not cross masonry joints.
- C. Install wiring devices in accordance with manufacturer's instructions.
- D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- E. Where required, connect wiring devices using pigtails not less than 6 inches long. Do not connect more than one conductor to wiring device terminals.
- F. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.
- G. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
- H. Provide GFI receptacles with integral GFI protection at each location indicated. Do not use feed-through wiring to protect downstream devices.
- I. Install securely, in a neat and workmanlike manner, as specified in NECA 1.
- J. Install wiring devices plumb and level with mounting yoke held rigidly in place.
- K. Install wall switches with OFF position down.
- L. Install wall dimmers to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.
- M. Connect dimmers within same room to the same phase of power distribution system.
- N. Do not share neutral conductor on branch circuits utilizing wall dimmers.
- O. Install vertically mounted receptacles with grounding pole on bottom and horizontally mounted receptacles with grounding pole on left.
- P. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.
- Q. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.
- R. Install identification label for wall switches and wall dimmers in accordance with Section 26 0526 indicating load served when controlling loads that are not visible from the control location or multiple wall switches or wall dimmers are installed at one location.
- S. Install identification label for all receptacles in accordance with Section 26 0526 indicating serving branch circuit.
- T. Connect wiring device grounding terminal to branch circuit equipment grounding conductor.
- U. Install decorative plates on switch, receptacle, and blank outlets in finished areas.
- V. Connect wiring devices by wrapping conductor around screw terminal.
- W. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

3.04 INTERFACE WITH OTHER PRODUCTS

- A. Coordinate locations of outlet boxes provided under Section 26 0537 to obtain mounting heights specified and indicated on drawings.
- B. Install convenience receptacle 18 inches above finished floor in finished areas.
- C. Install dimmer 48 inches above finished floor.
- D. Install data / telephone jack 18 inches above finished floor.
- E. Install telephone jack for wall telephone to position top of telephone at 48 inches above finished floor.

3.05 FIELD QUALITY CONTROL

- A. Inspect each wiring device for damage and defects.
- B. Operate each wall switch and wall dimmer with circuit energized to verify proper operation.
- C. Operate each wall switch with circuit energized and verify proper operation.
- D. Verify that each receptacle device is energized.
- E. Test each receptacle to verify operation and proper polarity.
- F. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.
- G. Correct wiring deficiencies and replace damaged or defective wiring devices.

3.06 ADJUSTING

- A. Adjust devices and wall plates to be flush and level.
- B. Adjust the time delays, sensitivity and other settings on occupancy sensors as directed.

3.07 CLEANING

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

END OF SECTION



PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fuses.

1.02 RELATED REQUIREMENTS

- A. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- B. Section 26 2818 - Enclosed Switches: Fusible switches.

1.03 REFERENCE STANDARDS

- A. NEMA FU 1 - Low Voltage Cartridge Fuses; National Electrical Manufacturers Association; 2002 (R2007).
- B. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. UL 248-1 - Low-Voltage Fuses - Part 1: General Requirements; Current Edition, Including All Revisions.
- D. UL 248-8 - Low-Voltage Fuses - Part 8: Class J Fuses; Current Edition, Including All Revisions.
- E. UL 248-10 - Low-Voltage Fuses - Part 10: Class L Fuses; Current Edition, Including All Revisions.
- F. UL 248-12 - Low-Voltage Fuses - Part 12: Class R Fuses; Current Edition, Including All Revisions.
- G. UL 248-15 - Low-Voltage Fuses - Part 15: Class T Fuses; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Coordinate fuse clips furnished in equipment provided under other sections for compatibility with indicated fuses.
    - a. Fusible Enclosed Switches: See Section 26 2818.
  - 2. Coordinate fuse requirements according to manufacturer's recommendations and nameplate data for actual equipment to be installed.
  - 3. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

- A. See Section 01300 - Submittals and Substitutions for submittal procedures.
- B. Product Data: Provide manufacturer's standard data sheets including voltage and current ratings, interrupting ratings, time-current curves, and current limitation curves.

1.06 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Cooper Bussmann, a division of Cooper Industries: [www.cooperindustries.com](http://www.cooperindustries.com).
- B. Mersen (formerly Ferraz Shawmut): [ferrazshawmut.mersen.com](http://ferrazshawmut.mersen.com).
- C. Littelfuse, Inc: [www.littelfuse.com](http://www.littelfuse.com).

2.02 APPLICATIONS

- A. General Purpose Branch Circuits: Class RK1, time-delay.

2.03 FUSES

- A. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose indicated.
- B. Unless specifically indicated to be excluded, provide fuses for all fusible equipment as required for a complete operating system.
- C. Provide fuses of the same type, rating, and manufacturer within the same switch.
- D. Comply with UL 248-1.
- E. Unless otherwise indicated, provide cartridge type fuses complying with NEMA FU 1, Class and ratings as indicated.
- F. Voltage Rating: Suitable for circuit voltage.
- G. Class R Fuses: Comply with UL 248-12.
- H. Selectivity: Where the requirement for selectivity is indicated, furnish products as required to achieve selective coordination.
- I. Provide the following accessories where indicated or where required to complete installation:
  - 1. Fuseholders: Compatible with indicated fuses.
  - 2. Fuse Reducers: For adapting indicated fuses to permit installation in switch designed for fuses with larger ampere ratings.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that fuse ratings are consistent with circuit voltage and manufacturer's recommendations and nameplate data for equipment.
- B. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Do not install fuses until circuits are ready to be energized.
- B. Install fuses with label oriented such that manufacturer, type, and size are easily read.

END OF SECTION





PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Enclosed safety switches.

1.02 RELATED REQUIREMENTS

- A. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- B. Section 26 0529 - Hangers and Supports.
- C. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- D. Section 26 2813 - Fuses.
- E. Section 26 27 17 - Equipment Wiring

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.
- B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- C. NEMA KS 1 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum); 2013.
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- F. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- G. UL 98 - Enclosed and Dead-Front Switches; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Coordinate the work with other trades. Avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and within working clearances for electrical equipment required by NFPA 70.
  - 2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
  - 3. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.

1.05 SUBMITTALS

- A. See Section 01300 - Submittals and Substitutions for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for enclosed switches and other installed components and accessories.

- C. Shop Drawings: Indicate outline and support point dimensions, voltage and current ratings, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.
  - D. Project Record Documents: Record actual locations of enclosed switches.
  - E. Maintenance Data: Include information on replacement parts and recommended maintenance procedures and intervals.
- 1.06 QUALITY ASSURANCE
- A. Conform to requirements of NFPA 70.
- 1.07 DELIVERY, STORAGE, AND HANDLING
- A. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
  - B. Handle carefully in accordance with manufacturer's written instructions to avoid damage to enclosed switch internal components, enclosure, and finish.
- 1.08 FIELD CONDITIONS
- A. Maintain ambient temperature between -22 degrees F and 104 degrees F during and after installation of enclosed switches.
  - B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

## PART 2 PRODUCTS

- 2.01 MANUFACTURERS
- A. Eaton Corporation; Cutler-Hammer Products: [www.eaton.com](http://www.eaton.com).
  - B. Schneider Electric; Square D Products: [www.schneider-electric.us](http://www.schneider-electric.us).
  - C. Source Limitations: Furnish enclosed switches and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.
- 2.02 ENCLOSED SAFETY SWITCHES
- A. Description: Quick-make, quick-break enclosed safety switches listed and labeled as complying with UL 98; heavy duty; ratings, configurations, and features as indicated on the drawings.
  - B. Provide products listed, classified, and labeled as suitable for the purpose intended.
  - C. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
    - 1. Altitude: Less than 6,600 feet.
    - 2. Ambient Temperature: Between -22 degrees F and 104 degrees F.
  - D. Horsepower Rating: Suitable for connected load.
  - E. Voltage Rating: Suitable for circuit voltage.

F. Short Circuit Current Rating:

1. Provide enclosed safety switches, when protected by the fuses or supply side overcurrent protective devices to be installed, with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.
2. Minimum Ratings:
  - a. Heavy Duty Single Throw Switches Protected by Class R, Class J, Class L, or Class T Fuses: 200,000 rms symmetrical amperes.
  - b. Double Throw Switches Protected by Class R, Class J, or Class T Fuses: 100,000 rms symmetrical amperes.

G. Provide with switch blade contact position that is visible when the cover is open.

H. Fuse Clips for Fusible Switches: As required to accept fuses indicated.

1. Where NEMA Class R fuses are installed, provide rejection feature to prevent installation of fuses other than Class R.

I. Conductor Terminations: Suitable for use with the conductors to be installed.

J. Provide insulated, groundable fully rated solid neutral assembly where a neutral connection is required, with a suitable lug for terminating each neutral conductor.

K. Provide solidly bonded equipment ground bus in each enclosed safety switch, with a suitable lug for terminating each equipment grounding conductor.

L. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.

1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
  - a. Indoor Clean, Dry Locations: Type 1.
  - b. Outdoor Locations: Type 3R.
2. Finish for Painted Steel Enclosures: Manufacturer's standard, factory applied grey unless otherwise indicated.

M. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.

N. Heavy Duty Switches:

1. Comply with NEMA KS 1.
2. Conductor Terminations:
  - a. Provide mechanical lugs unless otherwise indicated.
  - b. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
3. Provide externally operable handle with means for locking in the OFF position, capable of accepting three padlocks.

O. Provide the following features and accessories where indicated or where required to complete installation:

1. Hubs: As required for environment type; sized to accept conduits to be installed.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Verify that field measurements are as shown on the drawings.
- B. Verify that the ratings of the enclosed switches are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive enclosed safety switches.
- D. Verify that conditions are satisfactory for installation prior to starting work.

#### 3.02 INSTALLATION

- A. Install enclosed switches in accordance with manufacturer's instructions.
- B. Install enclosed switches securely, in a neat and workmanlike manner in accordance with NECA 1.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide required supports in accordance with Section 26 0529.
- E. Install enclosed switches plumb.
- F. Except where indicated to be mounted adjacent to the equipment they supply, mount enclosed switches such that the highest position of the operating handle does not exceed 79 inches above the floor or working platform.
- G. Provide grounding and bonding in accordance with Section 26 0526.
- H. Provide fuses complying with Section 26 2813 for fusible switches as indicated or as required by equipment manufacturer's recommendations.
- I. Identify enclosed switches in accordance with Section 26 0553.
- J. Provide identification label on inside door of each fused switch indicating NEMA fuse class and size installed in accordance with Section 26 0553.
- K. Provide arc flash warning labels in accordance with NFPA 70.
- L. Provide floor markings to clearly indicate required working clearances where indicated or where required by the authority having jurisdiction.
- M. Equipment shall have a nameplate installed and mounted to the front cover and indicate: switch type, ampere rating, voltage rating, short-circuit rating, and load served.

#### 3.03 FIELD QUALITY CONTROL

- A. Correct deficiencies and replace damaged or defective enclosed safety switches or associated components.

#### 3.04 ADJUSTING

- A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

3.05 CLEANING

- A. Clean dirt and debris from switch enclosures and components according to manufacturer's instructions.
- B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION



PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Interior luminaires.
- B. LED Drivers
- C. Luminaire accessories.

1.02 RELATED REQUIREMENTS

- A. Section 26 0537 - Boxes.
- B. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- C. Section 26 2726 - Wiring Devices: Manual wall switches and wall dimmers.

1.03 REFERENCE STANDARDS

- A. ANSI C78.379 - American National Standard for Electric Lamps -- Reflector Lamps -- Classification of Beam Patterns; 2006.
- B. ANSI C82.1 - American National Standard for Lamp Ballast - Line Frequency Fluorescent Lamp Ballast; 2004.
- C. ANSI C82.4 - American National Standard for Ballasts for High-Intensity-Discharge and Low Pressure Sodium Lamps (Multiple-Supply Type); 2002.
- D. NECA 1 - Standard for Good Workmanship in Electrical Construction; National Electrical Contractors Association; 2010.
- E. NECA/IESNA 500 - Standard for Installing Indoor Commercial Lighting Systems; National Electrical Contractors Association; 2006.
- F. NECA/IESNA 502 - Standard for Installing Industrial Lighting Systems; National Electrical Contractors Association; 2006.
- G. NEMA LE 4 - Recessed Luminaires, Ceiling Compatibility; National Electrical Manufacturers Association; 2006.
- H. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- I. UL 1598 - Luminaires; Current Edition, Including All Revisions.
- J. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Coordinate the installation of luminaires with mounting surfaces installed under other sections or by others. Coordinate the work with placement of supports, anchors, etc. required for mounting. Coordinate compatibility of luminaires and associated trims with mounting surfaces at installed locations.

2. Coordinate the placement of luminaires with structural members, ductwork, piping, equipment, diffusers, fire suppression system components, and other potential conflicts installed under other sections or by others.
  3. Coordinate the placement of exit signs with furniture, equipment, signage or other potential obstructions to visibility installed under other sections or by others.
  4. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.
- 1.05 SUBMITTALS
  - A. See Section 01300 - Submittals and Substitutions for submittal procedures.
  - B. Shop Drawings:
    1. Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
  - C. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.
    1. Lamps: Include rated life, color temperature, color rendering index (CRI), and initial and mean lumen output.
  - D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
  - E. Operation and Maintenance Data: Instructions for each product including information on replacement parts.
- 1.06 QUALITY ASSURANCE
  - A. Conform to requirements of NFPA 70.
  - B. Conform to requirements of NFPA 70 and the International Building Code (IBC), locally adopted version.
- 1.07 DELIVERY, STORAGE, AND PROTECTION
  - A. Receive, handle, and store products according to NECA/IESNA 500 (commercial lighting), NECA/IESNA 502 (industrial lighting), and manufacturer's written instructions.
  - B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.
- 1.08 FIELD CONDITIONS
  - A. Maintain field conditions within manufacturer's required service conditions during and after installation.
- 1.09 WARRANTY
  - A. See Section 01700 Contract Closeout for additional requirements.
  - B. Provide a five year full warranty on all LED light fixtures including the driver.



- C. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

## PART 2 PRODUCTS

### 2.01 LUMINAIRE TYPES

- A. Furnish products as indicated in luminaire schedule included on the drawings.  
B. Substitutions: See Section 01300 -Submittals and Substitutions.

### 2.02 LUMINAIRES

- A. Provide products that comply with requirements of NFPA 70.  
B. Provide products that are listed and labeled as complying with UL 1598, where applicable.  
C. Provide products that comply with requirements of NFPA 70 and NFPA 101.  
D. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.  
E. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.  
F. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.  
G. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.  
H. Recessed Luminaires:  
1. Ceiling Compatibility: Comply with NEMA LE 4.  
I. LED Luminaires: Listed and labeled as complying with UL 8750.  
1. Photometric measurements indicated on the product data shall be provided in accordance with IESNA LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-State Lighting products and shall meet the requirements specified and/or indicated on the drawings.  
2. Lumen data indicated on the product data sheets shall be generated in accordance with IESNA LM-80-08 Approved Method for Measuring Lumen Maintenance of LED Light Sources and shall meet the requirements specified and/or indicated on the drawings.  
3. Lumen depreciation shall be identified in terms of IES TM-21-11. Unless noted otherwise, luminaires shall provide a minimum L70 rating at the drive current provided product data shall indicate such.  
4. Correlated color temperature (CCT) indicated on the product data sheets shall be provided in accordance with ANSI C78.377-2008 American National Standard for Electric Lamps requirements specified and/or indicated on the drawings. Acceptable variation in color temperatures specified shall be +/- 275 degrees Kelvin.  
5. Lumen output specified shall be lumens delivered from the luminaire at the color temperature specified.

6. Luminaires efficacy shall meet that specified and scheduled at the CCT specified.

J. Luminaires Mounted in Continuous Rows: Provide quantity of units required for length indicated, with all accessories required for joining and aligning.

## 2.03 LED DRIVERS

A. Drivers shall be universal voltage (120-277 volt) or shall be 208 volt, 240 volt, or 480 volt to meet project conditions.

B. Drivers shall be provided with protection against transients line surge.

C. Drivers shall be equipped with a quick disconnect.

D. Power factor shall be greater than 0.90.

E. Harmonic distortion shall be less than 20 percent.

F. Ambient temperature range shall be -30 degrees F to 104 degrees F.

G. All drivers shall be UL listed.

## 2.04 ACCESSORIES

A. Stems for Suspended Luminaires: Steel tubing, minimum 1/2" size, factory finished to match luminaire or field-painted as directed.

B. Threaded Rods for Suspended Luminaires: Zinc-plated steel, minimum 1/4" size, field-painted as directed.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that field measurements are as shown on the drawings.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.

C. Verify that suitable support frames are installed where required.

D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.

E. Verify that conditions are satisfactory for installation prior to starting work.

### 3.02 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

### 3.03 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 26 0537 as required for installation of luminaires provided under this section.

B. Install products according to manufacturer's instructions.

- C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship), NECA 500 (commercial lighting), and NECA 502 (industrial lighting).
- D. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
- E. Suspended Ceiling Mounted Luminaires:
  - 1. Do not use ceiling tiles to bear weight of luminaires.
  - 2. Do not use ceiling support system to bear weight of luminaires unless ceiling support system is certified as suitable to do so.
  - 3. Secure pendant-mounted luminaires to building structure.
  - 4. Secure lay-in luminaires to ceiling support channels using listed safety clips at four corners.
  - 5. See appropriate Division 9 section where suspended grid ceiling is specified for additional requirements.
- F. Recessed Luminaires:
  - 1. Install trims tight to mounting surface with no visible light leakage.
  - 2. Non-IC Rated Luminaires: Maintain required separation from insulation and combustible materials according to listing.
- G. Suspended Luminaires:
  - 1. Unless otherwise indicated, specified mounting heights are to bottom of luminaire.
  - 2. Install using the suspension method indicated, with support lengths and accessories as required for specified mounting height.
  - 3. Provide minimum of two supports for each luminaire equal to or exceeding 4 feet in length, with no more than 4 feet between supports. Utilize 1/2 inch rigid conduit stems unless noted as chain or cable suspended on the drawings.
  - 4. Install canopies tight to mounting surface.
  - 5. Unless otherwise indicated, support pendants from swivel hangers.
- H. Install fixtures securely, in a neat and workmanlike manner, as specified in NECA 500 and 502.
- I. Install suspended luminaires and exit signs using pendants supported from swivel hangers. Provide pendant length required to suspend luminaire at indicated height.
- J. Support luminaires larger than 2 x 4 foot size independent of ceiling framing.
- K. Locate recessed ceiling luminaires as indicated on reflected ceiling plan.
- L. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prevent movement.
- M. Exposed Grid Ceilings: Fasten surface mounted luminaires to ceiling grid members using bolts, screws, rivets, or suitable clips.

- N. Install recessed luminaires to permit removal from below.
- O. Install recessed luminaires using accessories and firestopping materials to meet regulatory requirements for fire rating. Provide all necessary components to maintain ceiling system fire rating, coordinate with ceiling installer.
- P. Install clips to secure recessed grid-supported luminaires in place.
- Q. Install wall mounted luminaires, emergency lighting units, and exit signs at height as indicated on Drawings. Coordinate exact mounting heights with Architectural Drawings.
- R. Install accessories furnished with each luminaire.
- S. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within fixture; use flexible conduit.
- T. Connect luminaires and exit signs to branch circuit outlets provided under Section 26 0537 using flexible conduit.
- U. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.
- V. Bond products and metal accessories to branch circuit equipment grounding conductor.
- W. Install specified lamps in each emergency lighting unit, exit sign, and luminaire.
- X. Switch inboard (or center) and outboard lamps separately where two switched circuits are shown to luminaires on Drawings.
- Y. Attach all surface mounted fluorescent fixtures to ceiling or wall surface with a minimum of two attachment points besides the outlet box.
- Z. Install recessed plaster frames, or other special frames where required for construction type. Install frames securely to provide adequate light fixture support.
- AA. Insure that luminaires requiring access to ballasts or junction boxes have adequate openings and clearances.
- AB. Maintain required clearances between insulation and light fixtures where light fixtures are installed in an insulated ceiling. Provide barriers as needed to prevent insulation from contacting light fixture.
- AC. Pendant mounted luminaires shall utilize (2) 1/2 inch rigid conduit or factory stems with suitable canopy unless noted as "chain suspended" or "cable suspended." For sloped ceilings, provide a swivel type canopy. Install individually mounted pendant fluorescent fixtures with one stem at each end of fixture. Install pendant fixtures in rows with stems at 4 foot intervals.
- AD. For chain suspended and cable suspended light fixtures, use flexible metal conduit and attach to light fixture support chain or cable.
- AE. Provide adequate backing and support from the structural system for all pendent supported fixtures.
- AF. Coordinate light fixture installation in unfinished areas with piping, duct work and other obstructions. Exact light fixture location to be determined by field conditions. Suspend light fixture with chains or stems if necessary to avoid mounting light fixtures above ceiling mounted equipment, duct work and piping. Use trapeze style hangers to mount light fixtures under duct work piping or other equipment.

3.04 FIELD QUALITY CONTROL

- A. Inspect each product for damage and defects.
- B. Operate each luminaire after installation and connection to verify proper operation.
- C. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.
- D. Examine drawings and site conditions for ceiling construction, structural depths, piping and ductwork locations, door heights, upper cabinet heights and location, and other building elements. Coordinate to avoid conflict with luminaire installation.

3.05 ADJUSTING

- A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Architect. Secure locking fittings in place.
- B. Aim and adjust fixtures as directed.
- C. Position exit sign directional arrows as indicated.

3.06 CLEANING

- A. Clean surfaces according to NECA 500 (commercial lighting), NECA 502 (industrial lighting), and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.
- B. Clean electrical parts to remove conductive and deleterious materials.
- C. Remove dirt and debris from enclosures.
- D. Clean photometric control surfaces as recommended by manufacturer.
- E. Clean finishes and touch up damage.

3.07 CLOSEOUT ACTIVITIES

- A. Demonstration: Demonstrate proper operation of luminaires to Architect, and correct deficiencies or make adjustments as directed.
- B. Just prior to Substantial Completion, replace all lamps that have failed.
- C. See Section 01700 Contract Closeout, for additional requirements.

3.08 PROTECTION

- A. Protect installed luminaires from subsequent construction operations.

3.09 SCHEDULE - SEE DRAWINGS

END OF SECTION



## PART 1 GENERAL

### 1.01 SECTION INCLUDES

- A. Communications system design requirements.
- B. Communications pathways.
- C. Copper cable and terminations.
- D. Communications outlets.
- E. Communications identification.
- F. Cabling and pathways inside building(s).
- G. Distribution frames, cross-connection equipment, enclosures, and outlets.
- H. Grounding and bonding the telecommunications distribution system.

### 1.02 RELATED REQUIREMENTS

- A. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- B. Section 26 0534 - Conduit.
- C. Section 26 0537 - Boxes.
- D. Section 26 0553 - Identification for Electrical Systems: Identification products.
- E. Section 26 2726 - Wiring Devices.

### 1.03 REFERENCE STANDARDS

- A. NECA/BICSI 568 - Standard for Installing Building Telecommunications Cabling; National Electrical Contractors Association; 2006.
- B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. TIA-568-C.1 - Commercial Building Telecommunications Cabling Standard; Telecommunications Industry Association; Rev C, 2009 (with Addenda; 2012).
- D. TIA-568-C.2 - Balanced Twisted-Pair Telecommunications Cabling and Components Standards; Rev C, 2009 (with Addenda; 2014).
- E. TIA/EIA-568-B.3 - Commercial Building Telecommunications Cabling Standard - Part 3: Optical Fiber Cabling Components Standard, and Addendum 1 - Additional Transmission Performance Specifications for 50/125 um Optical Fiber Cables; Rev B, 2000; Addendum 1.
- F. TIA-569-C - Commercial Building Standard for Telecommunications Pathways and Spaces; Rev C, 2012 (with Addenda; 2013).
- G. TIA-606-B - Administration Standard for the Telecommunications Infrastructure; Rev B, 2012.
- H. TIA-607-B - Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises; Rev B, 2012 (with Addenda; 2013).
- I. ANSI/J-STD-607 - Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications; Rev A, 2002.

- J. UL 444 - Communications Cables; Current Edition, Including All Revisions.
- K. UL 497 - Standard for Protectors for Paired-Conductor Communications Circuits; Current Edition, Including All Revisions.
- L. UL 514C - Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers; Current Edition, Including All Revisions.
- M. UL 1863 - Communications-Circuit Accessories; Current Edition, Including All Revisions.

#### 1.04 SUBMITTALS

- A. See Section 01300 - Submittals and Substitutions for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.
  - 1. Storage and handling requirements and recommendations.
  - 2. Installation methods.
- C. Shop Drawings: Show compliance with requirements on isometric schematic diagram of network layout, showing cable routings, telecommunication closets, rack and enclosure layouts and locations, service entrance, and grounding, prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).
  - 1. Provide in writing as part of the Shop Drawing Submittal that the selected wiring and device Manufacturers system Warranty meets the requirements of Paragraph 1.07 Warranty.
- D. Manufacturer Qualifications.
- E. Evidence of qualifications for installer.
- F. Field Test Reports.
- G. Project Record Documents: Prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).
  - 1. Record actual locations of outlet boxes and distribution frames.
  - 2. Show as-installed color coding, pair assignment, polarization, and cross-connect layout.
  - 3. Identify distribution frames and equipment rooms by room number on contract drawings.
- H. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of project record documents.

#### 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: At least 3 years experience manufacturing products of the type specified.
- B. Installer Qualifications: A company having at least 3 years experience in the installation and testing of the type of system specified, and:
  - 1. Employing a BICSI Registered Communications Distribution Designer (RCDD).
  - 2. Supervisors and installers factory certified by manufacturers of products to be installed.



3. Employing experienced technicians for all work; show at least 3 years experience in the installation of the type of system specified, with evidence from at least 2 projects that have been in use for at least 18 months; submit project name, address, and written certification by user.
  4. The entire installation of the telecommunications system as specified in this section of the specifications shall be completed by an acceptable systems installer. The acceptable systems installers shall meet the following criteria.
    - a. The following installers have been reviewed for their performance and are acceptable installers for this project:
      - 1) Data Technologies, Inc.
      - 2) RBB Electric.
      - 3) JDP Electric
      - 4) Network Cabling Services.
    - b. All other installers requesting approval to bid this project must submit the following information for evaluation in accordance with Section 26 05 00 and the General Conditions:
      - 1) General Company Information.
      - 2) RCDD Certificate for person preparing and approving the installation.
      - 3) List of projects, with description of work performed in the last five years. Project list shall include cost of communications system, Owner's representative, address and telephone number.
    - c. Final approval of acceptable installers will be at the discretion of the Architect/Engineer and the Owner.
- 1.06 DELIVERY, STORAGE, AND HANDLING
- A. Store products in manufacturer's unopened packaging until ready for installation.
  - B. Keep stored products clean and dry.
- 1.07 WARRANTY
- A. See Section 01700 for additional warranty requirements.
  - B. Correct defective Work within a 1 year period after Date of Substantial Completion.
  - C. Manufacturer shall warranty and provide maintenance service for 15 years minimum on the network system and a lifetime for products used in the system.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Cabling and Equipment:
  1. Cabling and Equipment:
    - a. Panduit Equipment
    - b. General Cable

## 2.02 SYSTEM DESIGN

- A. Provide a complete permanent system of cabling and pathways for voice and data communications, including cables, conduits and wireways, pull wires, support structures, and miscellaneous materials.
  - 1. Comply with TIA-568 (cabling) and TIA-569 (pathways), latest editions (commercial standards).
  - 2. Provide fixed cables and pathways that comply with NFPA 70 and TIA-607 and are UL listed or third party independent testing laboratory certified.
  - 3. Provide connection devices that are rated for operation under conditions of 32 to 140 degrees F at relative humidity of 0 to 95 percent, noncondensing.
  - 4. In this project, the term plenum is defined as return air spaces above ceilings, inside ducts, under raised floors, and other air-handling spaces.
- B. System Description:
  - 1. Building Entrance: Existing.
  - 2. Horizontal Cabling: Copper.
- C. Main Distribution Frame (MDF): Centrally located support structure for terminating horizontal cables that extend to telecommunications outlets, functioning as point of presence to external service provider.
  - 1. Locate main distribution frame as indicated on the drawings.
  - 2. Capacity: As required to terminate all cables required by design criteria plus minimum 25 percent spare space.
- D. Backbone Cabling: Cabling, pathways, and terminal hardware connecting intermediate distribution frames (IDF's) with main distribution frame (MDF), wired in star topology with main distribution frame at center hub of star.

## 2.03 PATHWAYS

- A. Conduit: As specified in Section 26 0534; provide pull cords in all conduit.
- B. Outlets
  - 1. As specified in Section 26 05 37 - Boxes.
  - 2. Four and 11/16-inch square box, 2 1/8 inch deep with single gang plaster ring.
- C. Underground Service Entrance: Rigid polyvinyl chloride (PVC) conduit, Schedule 40.

## 2.04 COPPER CABLE AND TERMINATIONS

- A. Copper Horizontal Cable: TIA/EIA-568 Category 6 enhanced, solid conductor unshielded twisted pair (UTP), 23 AWG, 100 ohm; 4 individually twisted pairs; covered with blue jacket and complying with all relevant parts of and addenda to latest edition of TIA/EIA-568 and UL 444.
  - 1. Manufacturer: General Genspeed 6500 Series.
    - a. Plenum rated cable, NFPA 70 type CMP.

B. Jacks and Connectors: Modular RJ-45, non-keyed, terminated with 110-style insulation displacement connectors (IDC); high impact thermoplastic housing; suitable for and complying with same standard as specified horizontal cable; UL 1863 listed.

1. Performance: 500 mating cycles.
2. Voice and Data Jacks: 4-pair, pre-wired to T568B configuration.
3. Connector modules shall be Panduit CJ688TG.
4. Category 6 8-position, 8-wire power sum connector, blue in color.

C. Faceplates:

1. Modular faceplates shall be Panduit Mini-Com Stainless Steel with label faceplates, 6 port, single gang device.
2. Stainless Steel plates with labels.
3. See Drawings for quantity of connector modules and modular faceplates
4. Provide with clear station and port label covers.
5. Provide blank plates for unused ports.

## 2.05 COMMUNICATIONS OUTLETS

A. Outlet Boxes: Comply with Section 26 0537.

1. Provide depth as required to accommodate cable manufacturer's recommended minimum conductor bend radius.

B. Wall Plates:

1. Comply with system design standards and UL 514C.
2. Accepts modular jacks/inserts.
3. Capacity:
  - a. Data or Combination Voice/Data Outlets: 6 ports. Provide blank insert for unused ports.
4. Wall Plate Material/Finish - Flush-Mounted Outlets: Type 302 stainless steel, 6 port with ID label window, compatible with Panduit Minicom jacks.

## 2.06 GROUNDING AND BONDING COMPONENTS

A. Comply with TIA-607.

B. Comply with Section 26 0526.

## 2.07 IDENTIFICATION PRODUCTS

A. Comply with TIA-606.

B. Comply with Section 26 0553.

## 2.08 SOURCE QUALITY CONTROL

A. Factory test cables according to TIA-568.

## 2.09 CROSS-CONNECTION EQUIPMENT

A. Patch Panels for Copper Cabling: Sized to fit EIA standard 19 inch wide equipment racks; 0.09 inch thick aluminum; cabling terminated on Type 110 insulation displacement connectors; printed circuit board interface.

1. Panduit CPP48BL 48-port all metal modular patch panel frames, populated with Panduit CJ688T Category 6 power sum connectors.
2. Jacks: Non-keyed RJ-45, suitable for and complying with same standard as cable to be terminated; maximum 48 ports per standard width panel.
3. Capacity: Provide ports sufficient for cables to be terminated plus 25 percent spare.
4. Labels: Factory installed laminated plastic nameplates above each port, numbered consecutively; comply with TIA/EIA-606 using encoded identifiers.
5. Provide incoming cable strain relief and routing guides on back of panel.

## 2.10 FIRESTOP

A. Cable Sleeves

1. Manufacturer: Hilti CP 653 Speed Sleeve or approved Equal
2. Provide cable sleeves at all up to 2 hour fire rated wall penetrations.
3. Provide quantity and size (either 2 inch or 4 inch) of sleeves as required for 60% maximum fill of the quantity of cables being installed.
4. For non-fire rated partitions, provide conduit sleeves through the partitions providing quantity and size of conduits as required for 60% maximum fill of the quantity of cables being installed.

B. See Section 26 05 34 for additional fireproofing requirements.

## 2.11 CABLE SUPPORT HANGERS

A. J-hooks shall be equal to Panduit J-Pro series Cable Support System

1. Panduit JP2 Series j-hook shall be used for up to 46 Category 6 4-pair communications cables.
2. Panduit JP4 Series j-hook shall be used for up to 180 Category 6 4-pair communications cables.
3. Manufacturer guidelines shall be used for supporting/mounting the J-hooks. Provide wall mount, ceiling mount, threaded rod clip, beam clamp, etc. mounting option as appropriate for the installation
4. Cable shall be supported at no greater than four-foot intervals. Provide a cable tie at each J-hook to retain and manage the cable bundle.
5. J-hooks to be UL listed as suitable for air handling plenum spaces.

## PART 3 EXECUTION

### 3.01 INSTALLATION - GENERAL

- A. Comply with latest editions and addenda of TIA-568 (cabling), TIA-569 (pathways), TIA-607 (grounding and bonding), NECA/BICSI 568, NFPA 70, and SYSTEM DESIGN as specified in PART 2.
- B. See Section 26-0534 Conduit for Telecommunications raceway installation requirements.
- C. See Section 26-0526 Grounding and Bonding for Electrical Systems for Telecommunications systems grounding and bonding requirements.
- D. Comply with Communication Service Provider requirements.
- E. Grounding and Bonding: Perform in accordance with TIA-607 and NFPA 70.

### 3.02 INSTALLATION OF EQUIPMENT AND CABLING

- A. Cabling:
  - 1. Do not bend cable at radius less than manufacturer's recommended bend radius; for unshielded twisted pair use bend radius of not less than 4 times cable diameter.
  - 2. Do not over-cinch or crush cables.
  - 3. Do not exceed manufacturer's recommended cable pull tension.
  - 4. When installing in conduit, use only lubricants approved by cable manufacturer and do not chafe or damage outer jacket.
  - 5. Install cable support hooks a maximum of 4'-0" on center above ceiling.
  - 6. Where telecommunication cables are run exposed above accessible ceilings, support the cables to keep them from resting on ceiling tiles. Use properly sized D rings and J-Hooks on walls above the ceilings to neatly route cables between outlet and termination locations. Minimum distance between supports is 4 feet or in accordance with EAI/TIA standards, whichever is less.
- B. Service Loops (Slack or Excess Length): Provide the following minimum extra length of cable, looped neatly:
  - 1. At Distribution Frames: 120 inches.
  - 2. At Outlets - Copper: 12 inches or as noted.
- C. Copper Cabling:
  - 1. Copper Cabling Not in Conduit: Use only type CMP plenum-rated cable as specified.
  - 2. Bridged taps/splices are not allowed as part of the horizontal wiring system. Avoid routing cables near EMI noise sources.
  - 3. All cabling shall consist of 4 pair, 1 cable per jack.
  - 4. Install modular outlets at all locations shown on the Drawings. Terminate wiring at workstation jacks and rack.
  - 5. Install cable from all workstation outlets to rack.

6. Each workstation jack shall be provided with its own UTP cable continuous (without splice) from jack to rack.
7. Telecommunications wiring shall be used for both voice and data wiring.
8. Where indicated, workstation jacks may be ganged under a common one gang wall plate.

D. Identification:

1. Use wire and cable markers to identify cables at each end.
2. Use manufacturer-furnished label inserts, identification labels, or engraved wallplate to identify each jack at communications outlets with unique identifier.

E. Field-Installed Labels: Comply with TIA/EIA-606 using encoded identifiers.

1. Cables: Install color coded labels on both ends.
2. Patch Panels: Label each jack as to its type and function, with a unique numerical identifier.
3. All labels shall be a machine label in conformance with ANSI/EIA/TIA 606.
4. Labeling to be verified with Engineer and Owner.

3.03 FIELD QUALITY CONTROL

A. See Section 26-0500 - Basic Electrical Requirements for additional requirements.

B. Comply with inspection and testing requirements of specified installation standards.

C. Visual Inspection:

1. Inspect cable jackets for certification markings.
2. Inspect cable terminations for color coded labels of proper type.
3. Inspect outlet plates and patch panels for complete labels.

D. Testing - Copper Cabling and Associated Equipment:

1. Test operation of shorting bars in connection blocks.
2. Category 5e/6 Links: Perform tests for wire map, length, insertion loss, NEXT, PSNEXT, ELFNEXT, PSELFEXT, return loss, delay skew and propagation delay.
  - a. Utilize a Level III/Level IV rated tester compatible with the following test standards:
    - 1) TIA-1152 Level IIIe and ISO/IEC 61935-1 Level IV accuracy.
    - 2) TIA-58-C.2, TIA1152 Category 5, 5e, 6, 6A, and ISO/IEC 11801.
  - b. The cabling tester shall be approved for use with the selected connectivity solution for both Channel and Permanent Link tests, and for the associated warranty provided by the connectivity Manufacturers.
  - c. The company/individual testing the cable shall be manufacturer certified for products provided.
  - d. Contractor shall perform and document all conductor tests per TIA-568-B and ANSI/TIA-606. Return one copy of testing report to the Engineer and one copy to the Owner. All copper station runs must be tested after final installation and termination.

All cable runs shall be documented with a hard copy printout of the test results. This printout shall be bound and delivered to the Owner prior to final payment

- E. Final Testing: After all work is complete, including installation of telecommunications outlets, and telephone dial tone service is active, test each voice jack for dial tone.

END OF SECTION

